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THE PROBLEM OF ST. PAUL'S.

A SHORT while ago there appeared in the *Field* (October 25) an article by Mr. C. C. Hoyer Millar on the subject of St. Paul's Cathedral.

The periodical which gave it hospitality is not one necessarily appealed to by an architectural public, and it therefore seems reasonable to give the argument there set out the chance of receiving consideration by our own more technical readers.

Mr. Millar is not an architect, though we happen to know that he is a man of architectural and artistic sympathies. He writes, indeed, rather from the engineer's point of view, and this is in itself a reason for giving to his suggestions the respect due to one who approaches the problem from its strictly scientific side.

Put briefly, the idea of the article is that the soil below and immediately around the Cathedral has been suffering during the past decades from the loss of a percentage of the water which it previously carried; that this loss of water has resulted in the inevitable shrinkage which such a deprivation would naturally cause, and that the right way of correcting the defect is to put that water back.

The data appear to be sound, the logic appears to be good, and the conclusion seems only to await the answer to the question, "Is it practicable?"

St. Paul's-churchyard and its roadways were no doubt, during the first 150 years after the Cathedral was built, perfectly permeable to moisture. At first, as the writer points out, the houses in the neighbourhood, so far from being surrounded by paved enclosures, had gardens. The streets were paved with stones the interstices of which must have readily admitted to the soil below almost every drop of rain that fell upon them.

Mr. Millar is not excessive in his calculations on this point. He claims—and in this he has the support of no less an authority than the late Sir John Evans—that of all the water falling upon a given area in the London basin at least one-third may be considered as finding a lodgment in the subsoil. The remaining two-thirds are accounted for by evaporation and by surface drainage into streams and rivers.

In any case, and whatever be the amount of moisture which would in a year remain in or pass through the soil of St. Paul's-churchyard, it is quite clear that the impermeable paving with which the streets are now covered, the abolition of gardens, the increase of drainage, and, lastly, the disturbance of the subsoil by underground railways and other structures below the surface must have resulted in two causes of desiccation—a decreased supply of moisture and an increased facility for its rapid removal.

Any architect who has had reason to study the action of subsoil in connection with foundations will have made himself aware of two important phenomena. The first is the incredible result upon buildings, even of light weight, when moisture is removed in however slight a degree from the porous beds beneath their foundations. We have known a well-built modern building of only three stories in height to be cracked from top to bottom by a diminution of the water which used to saturate a shallow bed of soft soil below the footings. The second discovery is that drains carry a great deal more water than that which runs legitimately inside them. Every drain placed below the surface, however tightly the soil may be rammed in around it, causes a dislocation or loosening of its surrounding earth, and that loosened earth becomes a water conduit.

Some years ago there was an unexpected subsidence of certain important buildings in Cambridge. An architect who was consulted took the advice of an engineer, and the engineer's report was to the effect that the entire subsoil of the district affected had had its bulk disturbed by the percolation of moisture caused by increased sewage drainage, which percolation took place, of course, *outside*, not inside, the sewers.

As to the general effect of the disturbance of the water conditions in subsoil, we have, at the present time, a conspicuous illustration in the London district. Anyone who is interested in the subject or doubtful about it can revive his interest or remove his doubts by a promenade in Silvertown. He will there see houses, factories, and at least one church beset with cracks. These cracks are recent, and the great recent event in Silvertown has been the formation still in progress of a gigantic new dock. The dock works involve digging and pumping. Silvertown, of course, lies low, and its soil is so near the Thames level that one might expect it to be always water-logged; but it is quite clear that even there, in that land of water, the setting up of fresh lines of distribution has led to that diminution of bulk in the weight-bearing soil which makes for disturbed equilibrium in the buildings.

And now we come to Mr. Millar's remedy. We must, he thinks, put that lost water back. But how? Obviously we cannot recall the old conditions. The roads must remain impervious in their waterproof coverings, and the little patches of grass and garden in the churchyard can never do the work of the older spaces of permeable surface.

The writer's idea is to discharge water artificially into the soil by means of pipes of 6 in. to 10 in. diameter. These pipes would be bored with holes at intervals to permit easy discharge of the liquid, and the proposal is that they should be thrust vertically into the soil to a depth of 40 ft.

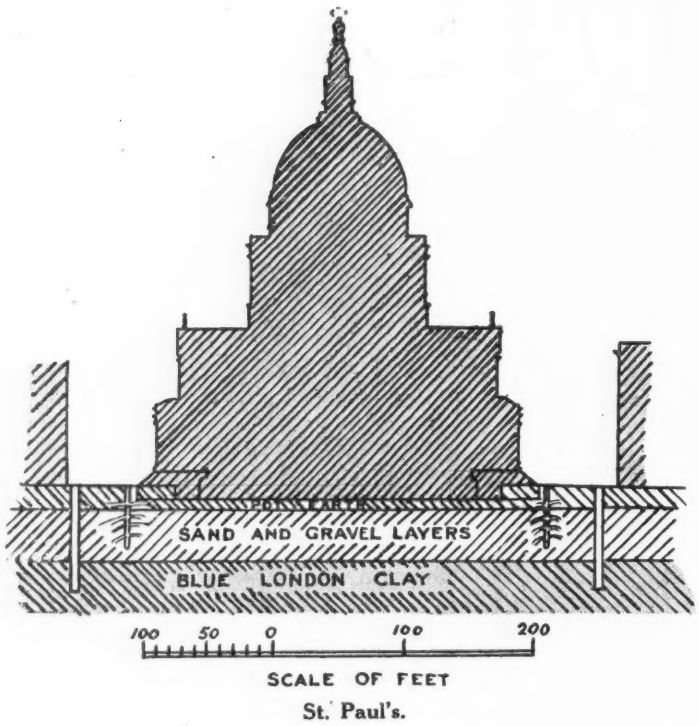
This suggestion was first made by Mr. Millar in a letter which he addressed to the *Times* in 1907. Taken by itself there is a good deal to be said against it. It might, for example, be urged that to attempt to cope with the matter on such lines would be unreasonably optimistic in view of the probability that water so admitted would traverse so vast an area that the amount required would be prodigious.

But Nature and Mr. Millar's further proposals make the suggestion much less chimerical than would at first sight appear.

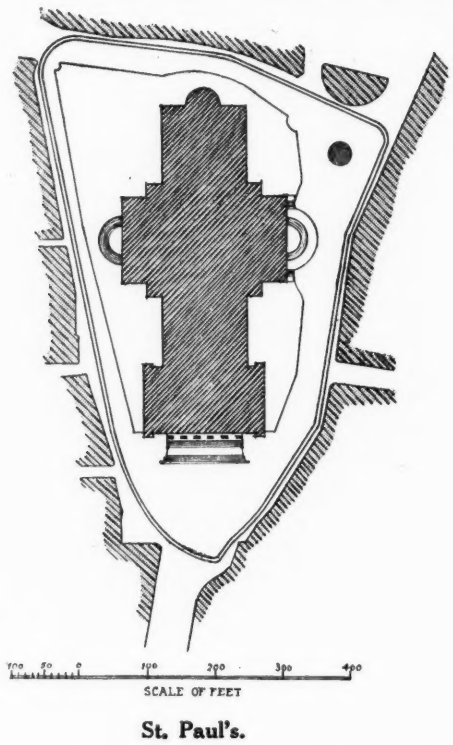
It is of no use to pour water into a receptacle which has neither bottom nor sides. But in this case Nature has provided a bottom, and the author of the proposal has a suggestion for the sides which modern methods of construction have rendered possible, if expensive.

The bottom is ready-made, being the familiar "London clay." The stratum upon which Wren built his structure is a layer of "pot earth" which lies immediately below the surface and is of an average depth of 5 ft. (at the north-east angle, as is well known, Wren found this stratum disturbed, and built up a solid pier from the London clay). Below the pot earth comes the water-bearing stratum of sand and gravel, the average depth of which is 35 ft. This, in turn, rests upon the "blue" or "London" clay. Anyone who has seen "London" clay knows its density; and its impermeability is provable by the success of the many artesian wells in the London basin which owe their efficiency solely to the fact that this wonderful undulating mat of stiff soil is impervious to water. Here, then, is a bottom of which no Danaids could complain. And what of the sides? Mr. Millar suggests that all round St. Paul's-churchyard there should be a wall of reinforced concrete, "with its foundation well below the surface of the London clay." We imagine that he might save his fellow-citizens the expense of taking it "well below." If bedded on the top of the clay we conclude that its efficiency would be secured.

The illustrations which we here give, though based upon those which accompanied Mr. Millar's article, are not identical, being prepared to indicate certain particulars in addition to



St. Paul's.



St. Paul's.

those which he illustrated. It will be seen that his proposed wall of ferro-concrete is intended to be taken all round St. Paul's-churchyard, and is placed as far as it conveniently can be from the fabric of the Cathedral without interfering with the houses which surround the open space.

We rather expect that it is in the construction of this wall that difficulties might arise inimical to the project. The ground beneath the roadways is, as we know, by no means clear of obstacles and obstructions. There are sewers and conduits and underground constructions of various kinds to be met with in the course of excavation, and it is obvious that, at whatever points the ferro-concrete wall might be compelled to cross any such obstacle, troubles would arise, the least of which would be the difficulty of forming a water-tight joint at the junction. Moreover, it would be necessary to make sure that no works—whether cellars or conduits left within the area of irrigation—were of such a nature as to be damaged by the increase of moisture produced by the scheme.

Obviously it would be best, if the project were accepted as practicable, to place the surrounding wall as close to the fabric of the Cathedral as it could be placed without risk to the structure itself. By this means the cubic space subjected to the moistening process would be proportionately limited in extent and the cost of irrigation proportionately lessened.

In fact, were it not that the mere excavation for the formation of the wall might in itself be a danger to the Cathedral, it would be natural to suggest that the surrounding barrier should be kept as near to the fabric as possible, thus diminishing the area of the space to be charged with water and reducing at the same time the cost of the construction.

As to the sprinklers or perforated tubes, it seems doubtful whether it would be necessary to carry them to the depth which Mr. Millar suggests. Water once admitted to the gravel subsoil would have no difficulty in permeating it. The difficulty with that 35 ft. of gravel has hitherto been that it transmitted water too readily; and it is reasonable to suppose that if water were freely admitted to its upper surface gravitation would rapidly do the rest.

Mr. Millar's scheme is at least a thoughtful contribution to a much-debated controversy, and, without wishing to express an opinion upon its practical value, we have considered it of sufficient interest to merit notice in these columns.

NOTES.

A Ministry of Art.

OF many indications that questions of art are exciting greater interest in this country than before is the large measure of support and sympathy which has been made manifest in connection with the question of the formation of a Ministry of Art. We hope that the Committee which has been formed, and which has appointed an Executive Committee to draw up working proposals for submission to the general body, will be successful in producing a scheme which will be favoured in Government circles. We have in our pages pointed out the reasons that exist for thinking the formation of such a Ministry would be advantageous to art and to our country, and we believe the fears of those who consider the movement as one making for further undesirable officialism are erroneous and ill-founded. There are pitfalls wherever we walk, but the fear of falling in these pitfalls should not make us stationary. It is more than possible that in its first years many mistakes would be made, and that we might see changes which could be made with advantage in its composition or functions, but we consider that in the long run the existence of a Ministry will make for the national good and for the progress of art as a whole.

Architectural Unity.

LET us hope that the New Year will bring with it a greater determination among the members of the architectural profession to promote that spirit of unity which is essential to progress. As we have frequently said, we look forward to seeing the Royal Institute placed in the position of the one central body representing the British architects and allied to all the various local societies throughout the lands of the Empire, because we are convinced that such a state of things is in the interests of all, but we are certain this can still be brought about without loss of dignity or friction if the obvious advantages of such a step are adequately considered. And, as we have said, we think the question of Registration should be considered and decided on such broad lines of facts as to convince all those who think. Either such a measure is feasible or it is not, and, if the latter, we do ourselves no good by knocking our heads against a stone wall, nor shall we increase the respect with which we are held outside. The past year has seen a great step forward in the formation of a British School at Rome, and we hope that this School will form the apex of a great system of art education. But we deprecate rivalry except the pleasant rivalry of comrades enthusiastic in the interests of the art they practise, and desirous of increasing the sum total of the benefit which those who excel confer on the race to which they belong.

The Modern Monte Cristo.

EVIDENTLY truth is as marvellous as fiction, and Monte Cristo did not part with immense sums more nonchalantly than Mr. Mallaby-Deeley seems to be willing to do. He buys an estate from the Duke of Bedford purely as a "private investment," and there "is very little to say about the future." A single cheque and a short agreement considered and signed in half an hour completed the transaction. What we may expect when Mr. Mallaby-Deeley determines to tackle something really large we do not know. The whole account, as given to the Press, reminds us of the way in which Monte Cristo presents his orders for unlimited credit to Baron Danglar. Like the Count, it is a question of millions, but millions of pounds sterling instead of francs, so to the honour of the country it may be said we have "gone one better" than France. Mr. Mallaby-Deeley has carried out one or two transactions which would have been considerable for an ordinary man. He was head of the syndicate which bought Piccadilly Hotel for £500,000, and was Chairman of the Northern Junction Railway, involving a capital of £2,000,000, which little sum he pledged himself to find, and he is said to have bought the St. George's Hospital site for £460,000. In the days which are past such a financier might have ended by purchasing a crown, and, even now, do we know what may be possible in the Balkan States?

BRONZE DOORS:

II.—MEDIÆVAL SOUTH ITALY.

WITH the beginning of the twelfth century the importation of bronze doors to South Italy from the East was discontinued, and the call for this class of work was immediately met by native artists, with the result that a new style of treatment of the bronze arose, more suited to the religious sense and artistic requirements of the people of Southern Italy. The first of these native artists was Roger of Melfi, in the Basilicata, whose work we find at Canosa; the second was Oderisius of Benevento, who made the doors of Troja, Benevento, and Capua; and lastly, Barisanus of Trani, whose first work was in his native city, but whose finest productions are the great doors of Ravello and Monreale.

The lives of these three men fill up the twelfth century; and we shall see in their work the gradual emancipation of the art of the bronze-founder from the archaic stiffness of Byzantine design to the introduction of graceful and classic forms, both in the ornament and sculpture, hinting at the coming Renaissance. At first we shall see the attempt to adapt the flat outline drawings of the damascener to the representation of pictorial scenes, and to the entire rejection of such methods in favour of sculpture in more or less relief.

Of these three artists we know little or nothing but what we may learn from their works; and indeed it is disputed whether Roger, the founder of the Canosa door, was of Melfi or Amalfi. But of the other two some fair conception may be formed; and they at least possess this individuality that each of them has, like Abbot Suger at S. Denis, left his portrait on one or other of his bronze doors. Oderisius of Benevento was in all probability of Teutonic race, and belonged to one of the most celebrated and most artistic Lombard cities of South Italy. Although in his two earlier works he continued to use the Greek manner of surface decoration, he used with it the rich, raised ornamentation common in Lombard architecture, and heads of a fantastic appearance, displaying all the energy of early German grotesques. Barisanus of Trani, on the other hand, who lived in a city less open to Teutonic influence, but in constant communication with the East, brought up amid classic surroundings, allowed his artistic fancy and technical skill as a goldsmith to be inspired by the ivories of Byzantine caskets and the terra-cottas of Magna Græcia.

The manner in which the surface decoration was executed on the doors of Roger of Melfi and Oderisius, which they had copied from the earlier Byzantine examples, was as follows. The outlines of the figures or drapery were cut into the surface of the bronze with a chisel, and then filled in with silver, coloured mastics, or niello. The heads and sometimes the feet and hands of the figures were formed of inlaid silver plates, having the features outlined thereon in fine niello lines, while the draperies and ornaments were formed in lines of green or red mastics. The effect of these various tints must have been very brilliant while the bronze preserved its original golden colour; and, although the patina on bronze may now be regarded as a mark of beauty, these bronze-door founders had another opinion. Doubtless, just at first, the metal was kept clean as a matter of course, but to prevent any neglect of so obvious a duty the maker of the door on Monte Sant' Angelo inscribed this on the left-hand leaf:—"Rogo et adjuro Rectores Sancti Angeli Michaelis ut semel in anno detergere faciatus has portas sicuti nos nunc ostendere fecimus ut sint semper lucide et clare."

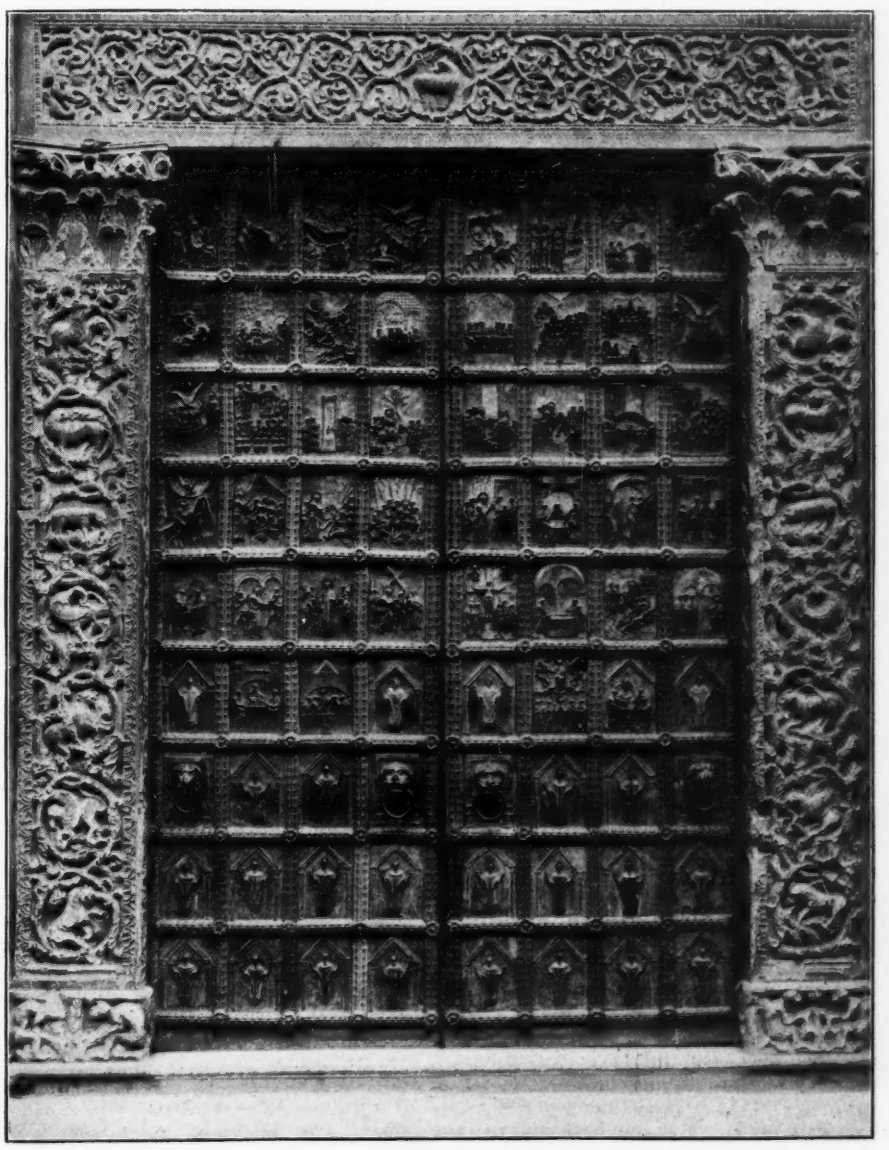
The bronze door to the tomb of Bohemond, at Canosa, the work of Roger of Melfi, is the earliest production of bronze-founding in South Italy and is dated 1111, the year of Bohemond's death. It is a very remarkable production, and, though the two leaves differ from each other in dimensions and design, is evidently the work of one man; and, while one leaf was cast whole, the other was made in sections, afterwards brazed together. The left leaf, which is the wider one, is formed in a single panel with a raised border of incised work of Saracenic design, enclosing three roundels formed by borders of Cufic ornament, the top one containing some incised figures, the bottom one a geometric ornament, and the centre one a lion's head for a closing ring, the first appearance of this feature in South Italy; while above and between these roundels are damascened inscriptions relating to Bohemond. The other leaf is divided into four panels by the Saracenic border, which is broken at intervals by heads of monsters in low relief very similar to English Norman work. The upper and lower panels bear large roundels of interlacing ornament, and the other two have incised figures in the usual Byzantine manner, but with this difference—instead of representing single and imaginary figures of saints, they are grouped and some attempt is made at portraiture. The upper of the two panels contains the sons of Robert Guiscard, Bohemond, and Roger, in a kneeling attitude below something which has disappeared, while the lower one has the three figures of their sons standing.

The earliest work of Oderisius of Benevento was in the two doors of Troja and that of Capua, now destroyed; those of Troja being dated 1119 and 1127 respectively, and that of Capua 1122. The west doors of Troja, which are in twenty-eight panels, were tampered with in 1593, when coats of arms and figures of that date were inserted; but of the twenty panels untouched, the top row of four contains incised figure subjects, in one of which is the portrait of Oderisius, and the four bottom panels bear inscriptions, one of which records the date of the manufacture. Two rows of panels have grotesque heads in relief, while a third row has, also in relief, two dragons and two crosses reminiscent of those on Byzantine doors. At the intersections are bosses of a cross form in high relief.

The south door of Troja is similar to the other, but in twenty-four panels, one row of which bears four lions' heads in relief and eleven of the others have incised figures, while the rest are given up to damascened inscriptions, one recording the name of Oderisius of Benevento, and the date 1127. The doors of Capua, of which now only drawings remain, bore reliefs and incised figures of the same character, and among the inscriptions was the statement—"Magister Oderisius Fecit Hoc Portas."

The great doors of the cathedral of Benevento are, by all the guide-books, stated to have been made in Constantinople; but by Pozzi and others, are, with more probability, ascribed to Oderisius. There is an entire absence of Byzantine feeling in the treatment of the reliefs and in the style of the ornament, while the intercourse between this city and Constantinople had nearly ceased under the Norman kings of South Italy at this period. At the same time, the theory that these doors were the work of Oderisius is not without difficulty. If the generally accepted date of 1150 be correct the founder must have been well advanced in years before he commenced this great work, and have considerably modified his style; whilst the omission of any inscription, such as appeared on the three other doors, is remarkable. Perhaps the most simple explanation would be that it was carried out by someone trained in his school and perhaps under his personal superintendence.

The most noticeable advance is in the entire abandonment of the flat Byzantine decoration



Benevento Cathedral: West Bronze Doors.

Benevento Cathedral: Detail of Bronze Doors.

of lines in silver and mastic and the substitution of relief ornament and sculptured figures. The introduction of pictorial groups of figures was perhaps the most startling innovation which would seem almost to point to some direct German influence; and, except that all the work at Benevento is more refined in its details and more artistic in the grouping of the figures, one might imagine that the designer was familiar with the work at Hildesheim or Verona. On twenty-four of the seventy-two panels into which the doors are divided are single figures of bishops, all placed under triangular canopies, and four panels contain lions' heads with rings, which are the only details reminiscent of Troja, while the remaining forty-four panels are occupied with scenes from the New Testament history. All the figures in the various groups are most carefully produced and their costumes distinctly shown; the architectural backgrounds are indicated with precision, and are evidently adapted from contemporary buildings. All such accessories, as the well-head in the scene of the Woman of Samaria, and as the sarcophagus in the Entombment, are most carefully delineated; and as examples of pictorial art in sculptured bronze these doors may take their place with the finest efforts of the Renaissance.

At San Clementi in Cacsauria in the Abruzzi is a pair of bronze doors, framed in seventy-two panels, of somewhat coarse work, with many repetitions of the same castings in the various panels, and with particularly grotesque heads holding rings as handles. These doors were made for Abbot Joel in 1191, and their design and casting have been attributed, without any reason or warrant, to Barisanus of Trani.

Barisanus of Trani is the best known of the bronze-founders of South Italy during the mediæval period, and his works at Trani, Ravello, and Monreale are justly esteemed as among the most beautiful productions of the founder's art. These three doors were all made within a few years of each other; those of Trani in 1175, and of Ravello in 1179, both at the expense of Sergio Muscettola, and ten years later—most likely through the introduction of the same patron—were produced those on the north side of the Duomo of Monreale. It may be noticed generally of all three of these doors that their frames and the enclosures to each panel are much more emphasised than in the doors of Oderisius, in this respect reverting again to Byzantine types, which, in the subdued richness of the whole surface, they display much more classic feeling.

The earliest of the three doors on the west front of the Duomo of Trani is in one particular very remarkable, because, unlike any other bronze doors of such importance, ancient or mediæval, it has been made with a round head to fit into the semicircular arch of the doorway; but this has, unfortunately, necessitated several awkward contrivances and the breaking up of the continuous lines of the enclosing borders. The lower part of the door, below the springing of the arch, contains twenty-eight panels, and the upper part six panels, of which four are spandrel-shaped. The two square panels in the upper part contain, repeated in each, a figure of Our Lord enthroned within a vesica piscis, with the Evangelistic symbols in the angles, and in the spandrel panels on each side of these are placed adoring angels. Of the twenty-eight panels below the springing two are occupied with lions' heads holding rings, and the eight in the lowest part of the door have figures of archers and wrestlers, or are filled with rich ornamental decoration; while the remaining panels are occupied by figures of saints in relief, among whom appears S. Nicholas the Pilgrim, the patron saint of Trani, with Barisanus prostrate before him. The extremely rich framing which divides the panels has amongst its scrollwork medallions on which are displayed centaurs, sirens, and other mythological subjects, beautifully modelled, which betray the source of much of Barisanus' inspiration; and each panel has round it, in addition to the framing, a rich enclosing border.

The great doors of Ravello consist of eighty panels, of which twenty-eight are occupied by the rich, broad border which frames in the whole of the door, and of the remainder, sixteen are devoted to bas-relief ornaments of a very classical type, and seem to have been copied from Græco-Italian terra-cottas, two to lions' heads and rings, and one bears a long inscription, which gives the date and name of donor all damascened in silver. The single figures in the panels are in almost all cases a reproduction of these at Trani, but the names of the different saints appear in silver letters on the backgrounds, and the enclosing borders of ornament have been omitted. At the top of each leaf Our Lord enthroned is repeated from Trani with the adoring angels on each side; but, as the panels enclosing these have here to be square, a piece has been added to the spandrel on which is another smaller angel; but the original curved line of the spandrel, marked by a roll moulding, still remains.

The doors of Monreale are smaller than either of the other pairs, and the broad enclosing border has been omitted and the doors divided into twenty-eight panels. These bear subjects which are, to a great extent, a reproduction of those at Trani, with the same panel borders except that in twelve of the panels these have been formed into arches resting on pillars and with little figures in the spandrels. The same mythological enrichments are repeated in the framework, a fact which Gravina, in his *Il Duomo di Monreale*, laments as presaging the Renaissance.

The bosses placed at the intersections of the framework are very rich and beautiful, those of Trani being square, of Monreale circular, and of Ravello some of each; and the manner in which these and the subjects of the panels have been reproduced in all three sets of doors shows that the founder regarded his models, in the most approved modern fashion, as a valuable asset in carrying on his business.

THE SURVEYORS' INSTITUTION.

Two strong Committees, representative of the whole of England and Wales, have been set up by the Council for the purpose of considering in detail the land policy of the Government as outlined in the Prime Minister's speech of December 9.

The Council have found that the condition now governing the Institution scholarships, which require Institution scholars to enter into articles with a member of the Institution on the completion of their University course, bear hardly upon persons of comparatively limited means. They believe that men with the first-rate technical education their scholars have received might expect to enter good offices as improvers without premium; and they have, therefore, decided that the Institution scholars shall only be required to enter into an agreement to enter the office of a surveyor approved by the Council with a view to practising as a surveyor in the future.

Mr. H. S. Morton, who gained the Institution Scholarship at Cambridge University in 1908, and afterwards entered the office of Mr. Charles Bidwell, Past-President, has been appointed Assistant Bursar at King's College, Cambridge.

The Council have voted the sum of 100 guineas towards the cost of the new laboratories at Rothamsted which are to be erected in commemoration of the Lawes and Gilbert Centenary. The cost of the laboratories is estimated at £12,000, and the Development Fund Commissioners will, it is understood, find half that amount if the remainder is provided by private subscription.

ARCHITECTURAL SOCIETIES.

Nottingham and Derby Architectural Society: The Priory Church of Tutbury.

A meeting of this Society was held on the 16th inst. at 64, St. James'-street, Derby. Messrs. E. H. Brown and E. Fincham were elected Associates. In the absence of the President, Mr. Harry Gill, Vice-President, occupied the chair. Other business being disposed of, Mr. J. R. Naylor, F.R.I.B.A., read a paper on "The Priory Church of Tutbury." After a general description of monastic buildings and the rules which influenced their planning, he referred to the church at Tutbury, and stated that his interest in it commenced at the time he was called in to report on the serious state of repair of the south aisle and tower. During the work of restoration many discoveries have been made of which he had made careful notes, and as few authorities can be consulted as to its history there are numerous features of interest which lend themselves to profitable architectural discussion. The church is dedicated to St. Mary the Virgin. Tutbury is mentioned in "Domesday Book" as "Toteberie," probably from an altar on the Castle Hill dedicated in Saxon time to their god "Tot" or "Thoth." William the Conqueror granted the castle to Henry de Ferrers, who founded the Priory of Tutbury. The foundation charter is dated 1080, and it is stated, although doubtful, that the church was finished in 1089. The plan was the usual one for Benedictine monks, with cloisters, dormitories, etc., adjoining the church. The church itself was a great church, the portions now remaining conveying but a poor impression of its original magnificence. The last Prior handed over the Priory to Henry VIII., and was pensioned by an annuity of £50. As its value was about £242, Henry's property was equal to about £200 per annum.

When Mr. Naylor took the repairs in hand the walls were in a very bad condition. These have been grouted in, the outer parts of window tracery replaced by new, and the old Norman doorway has been made safe. The whole of the old glass has been reused. Old oak, some given and some bought locally, has been used to replace what was rotten and missing. The old Norman floor is covered with a thick deposit of what seems to be decayed rushes, the flooring itself being of marl beaten hard. By means of specially prepared diagrams, drawings, and photographs Mr. Naylor then indicated what in his opinion were the original plans of the church, the filling of the triforium arches, the use of the interesting staircase at the west end, and the reason for the six peculiar shaped pillars in the arcade, and concluded with his views on the vexed question of what is allowable in the way of restoration of our old churches.

In the discussion which followed, in which Messrs. Woore, Whitbread, and others took part. Mr. Gleave, in proposing a vote of thanks to the lecturer, suggested that the Society might consider the question of visiting this interesting but little-known priory church while Mr. Naylor had it in hand. Mr. Heazell, who seconded the vote of thanks, remarked that it was gratifying to know that the restoration was in such careful and capable hands.

The Birmingham Architectural Association: Leadwork.

At the fifth general meeting, held at the Association's Rooms on December 12, Mr. Lawrence Weaver, F.C.A., delivered a lecture on the subject of "Leadwork," illustrated by numerous lantern slides.

At the outset the lecturer observed that, being personally of a cheerful disposition, he could not do better than give as his first example of English leadwork an illustration of a lead coffin, probably of the Romano-British period; and from the afore mentioned dim and distant ancient days he traced, by means of existing examples, the history and development of such lead applications as may be found in or on fonts, spires, rain-water heads, cisterns, portrait statuary, garden statuary, vases, and other ornaments. Dealing with rain-water heads, Mr. Weaver expressed the opinion that there was little of this work, of authenticity, in this country prior to about 1620, although he did show examples dated 1589 and 1605, but these he regarded rather in the nature of exceptions. The illustrations shown of rain-water heads portrayed some magnificent examples from the length and breadth of the country containing, in the words of the lecturer, some "jolly" ornament, and much enhanced by sundry well-placed "bits of fat." Lead-covered timber spires, he considered, were the forerunners of stone ones, and the reason that the lead-covered structures were superseded by masonry he attributed to the fact that it was found that the former were so easily destroyed by fire, as happened in so many cases. The lecturer made the interesting observation that the thickness of the lead fonts was seldom more than $\frac{3}{4}$ in., and that statues and garden figures were often not more than $\frac{3}{16}$ in. to $\frac{1}{4}$ in. thick. Amongst the smaller lead articles examples were shown and described of ancient seals and quaint little souvenirs which pilgrims were wont to carry away with them after visiting the shrines and saints. Mr. Weaver called attention to the fact that England of to-day was exceptionally fortunate in possessing so many fine examples of old leadwork, especially when the nature of the material and the ease with which it could be melted up was taken into consideration. He also pointed out the many and various methods and manners wherein lead might with advantage be employed on modern buildings, and indulged in a pleasing flight of fancy concerning all metal structures—steel construction covered with lead.

The President, Mr. G. Salway Nichol, occupied the chair, and a vote of thanks was proposed by Mr. Buckland, seconded by Mr. Bateman, and supported by Messrs. Holland, W. Hobbis, and Arthur Harrison.

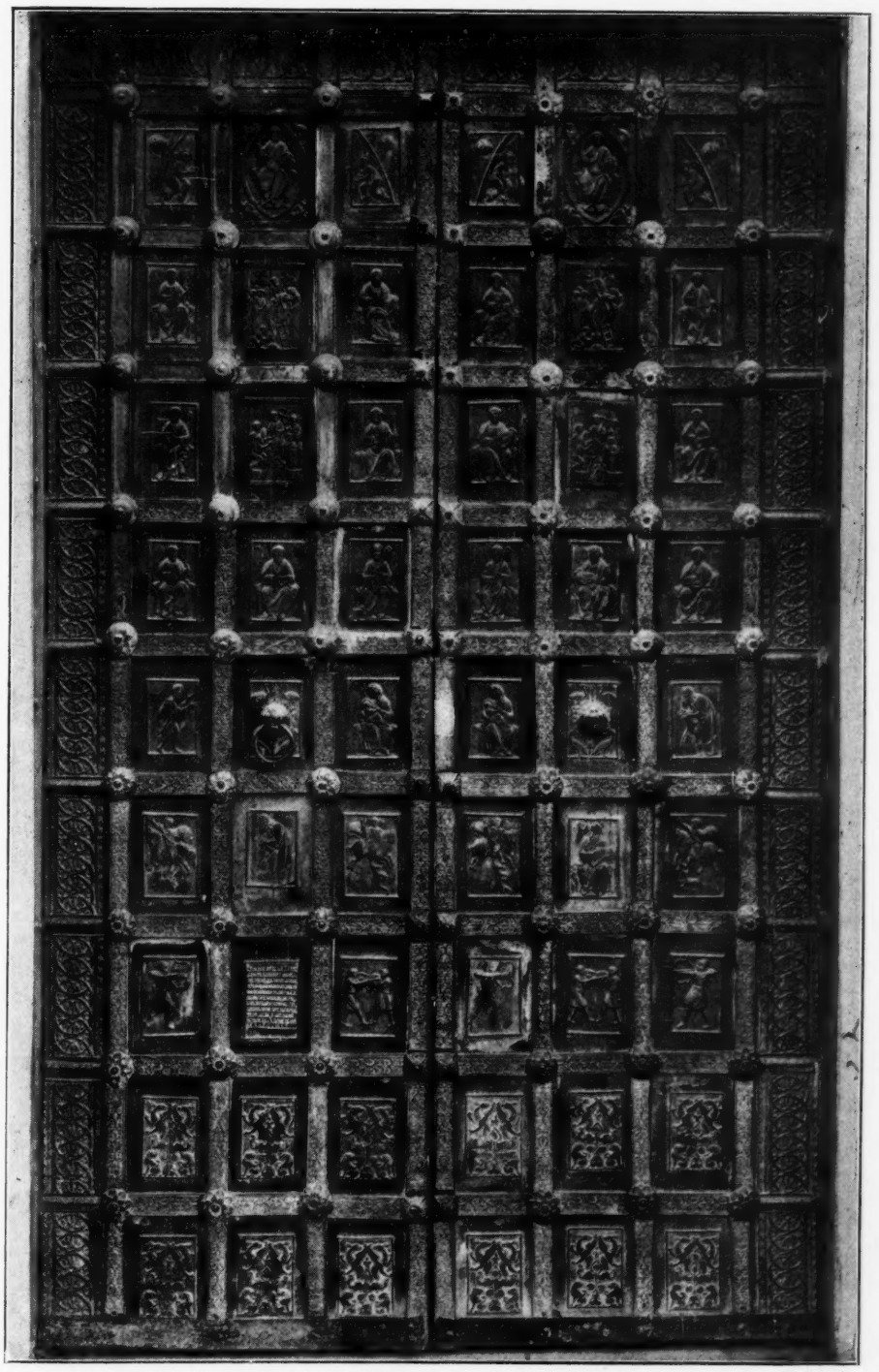
The Royal Institute of the Architects of Ireland.

The seventy-fourth annual general meeting of this Institute was held at the Institute Rooms, No. 31, South Frederick-street, Dublin, on Wednesday, December 10. The President, Mr. A. E. Murray, R.H.A., F.R.I.B.A., occupied the chair. The following Fellows and members attended:—Messrs. F. Hayes, E. H. Morris, J. Holloway, R. Stirling, C. A. Owen, G. C. Ashlin, C. H. Ashworth, R. O'Brien Smyth, J. Geoghegan, P. L. Dickinson, G. Beckett, C. H. Mitchell, R. Caulfeild Orpen, Vice-President; Professor Scott, Hon. Treasurer; and F. G. Hicks, Hon. Secretary.

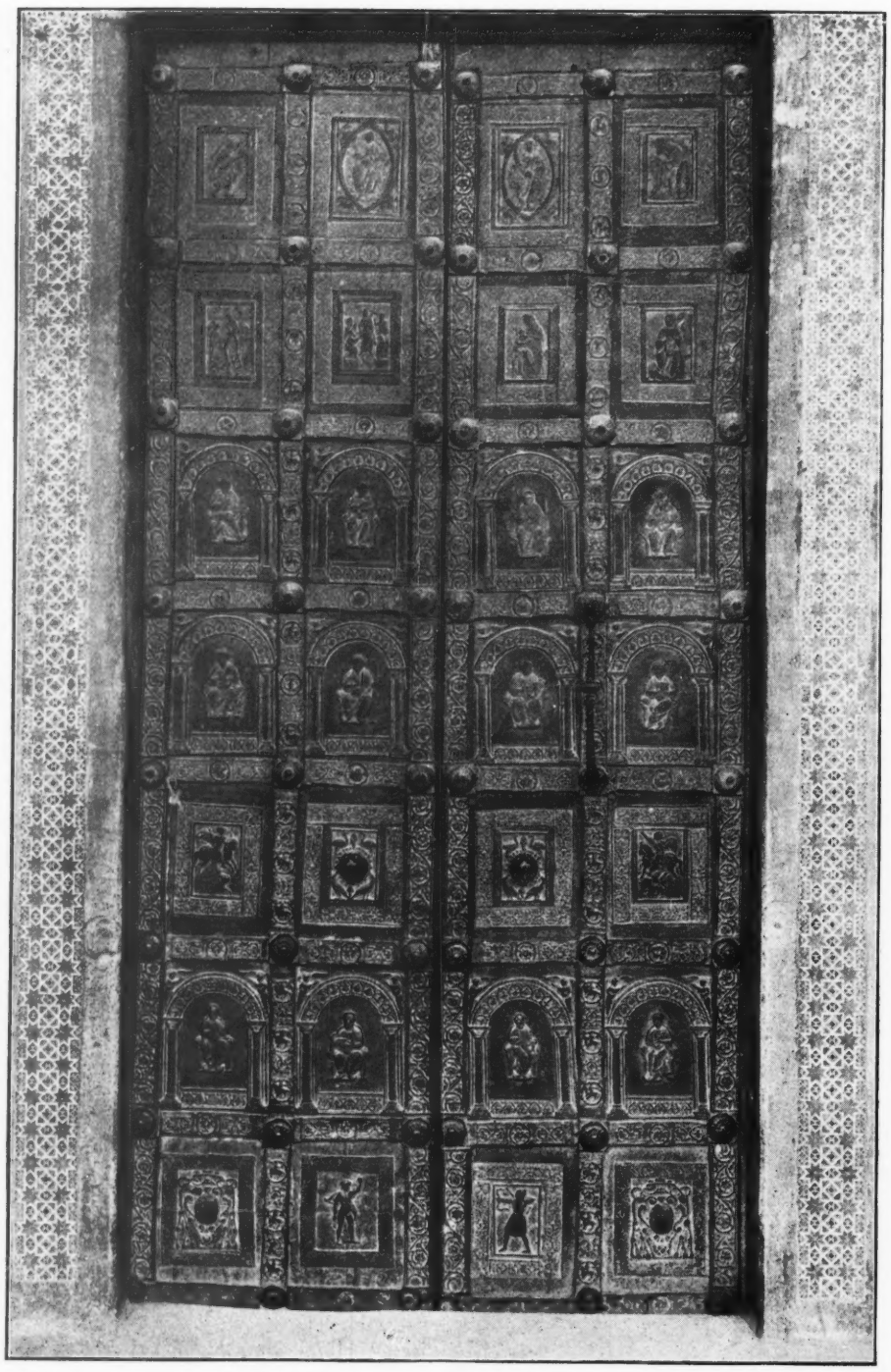
The scrutineers of the ballot for the election of President and Vice-President, to serve for the ensuing three years, submitted their Report. The President declared Mr. R. Caulfeild Orpen, R.H.A., Fellow, elected President of the Institute, and Mr. W. Kaye-Parry, M.A., Fellow, Vice-President.

The scrutiny of the ballot for Council disclosed the following result:—Messrs. C. H. Ashworth, L. O'Callaghan, J. H. Webb, Frederick Hayes, C. A. Owen, A. G. C. Millar, G. P. Sheridan, G. L. O'Connor, and C. J. MacCarthy.

The Hon. Secretary read the Report of Council for the year 1913. Mr. C. H. Ashworth, in moving the adoption of the Report, said it chronicled the progress and prosperity of the Institute. The influence of the Council had on several occasions been used to the benefit of its members. He touched on the subject of the housing problem. He feared that the commercial condition of Dublin made the problem a very difficult one to solve. He



Ravello Cathedral: West Bronze Doors.



Monreale Cathedral: North Bronze Doors. (*See page* 695.)

noted the changed conditions of membership of the Institute; and he urged the younger members to support this examination as the gate of entry to the Institute. This examination was established mainly with the view of affording an incentive to students in Ireland. Mr. G. C. Ashlin seconded the adoption of the Report. Mr. O'Brien Smyth and Mr. R. Stirling supported the adoption of the Report, which was passed unanimously.

The following members were raised to the rank of Fellowship and presented with certificates:—Messrs. Lucius O'Callaghan, H. Allberry, L. A. MacDonnell, P. J. Lynch, A. G. C. Millar, and Professor W. A. Scott.

Mr. Robert Stirling and Mr. E. H. Morris were elected auditors for the ensuing year.

Mr. J. Geoghegan was nominated by the Architectural Association of Ireland to represent that body on the Council of the Institute.

Professor Scott, Hon. Treasurer, submitted the financial Report of the Institute. The accounts showed a substantial credit balance. Mr. Robert Stirling proposed the adoption of the Report. Mr. C. A. Owen seconded. He pointed out that the overdraft at the bank, which was now extinguished, had been raised some years ago, when the building in which the meeting was being held was purchased by the Council. The Report was adopted.

The President proposed that a very old and valued Fellow, who, owing to failing health, had tendered his resignation, be elected an honorary member of the Institute, which was approved.

The President read his valedictory address and, in returning thanks, congratulated the members on the results of the two recent competitions, which showed that Irish architects are capable of designing buildings which will be a credit to our country. He also referred to the high marks obtained at the examination for studentship, which presages a high standard of qualification in the coming members.

He then placed on the table the Loving Cup, originally presented to the late Sir Thomas Drew by this Institute, and lately bequeathed back to the Institute by his widow. The cup having been lined with a suitable material, it was handed round the table, and the health of the President-elect was drunk by the members. Mr. Orpen responded, and desired to be allowed to propose the health of Mr. Murray, the outgoing President. Mr. Owen seconded, and the toast was drunk with musical honours.

In the course of his address Mr. Murray said that the better the education of the architect and the better the societies connected with architecture are the more gain to the public, who will reap the benefit of that education in more beautiful buildings and in the knowledge and business capacity of the architect who has to conduct their work and spend their money. The public have a right, as in other professions, to know who is qualified and who is not. And I say they must look to our Institute and other societies like it to give them that assurance of knowledge, uprightness, and integrity. The profession was never so well equipped in their schools for learning as they are at present. Any young man who selects the profession of architecture has every opportunity of studying under capable instructors. The Architectural Association is doing good work in their classes, and we have the National University School presided over by our friend and fellow-member, Professor Scott; we have the greatest confidence in his knowledge and skill, and hope the young architect will not be unmindful of the opportunities afforded him of learning. I am glad to see that members are coming into this Institute through the channel of examination. As time goes on, and we that sit round this table have passed away, no doubt the Institute will be constituted of none but those who have passed the examination, and who will naturally look for a high standard from those who wish to enter our portals. We hoped that by now the Registration Bill would have made some progress; but, alas, this has not been realised, as we know some crux has arisen, and it was found impossible to bring the Bill before Parliament! However, the R.I.B.A. are not neglectful of our interests, and have a scheme on foot that will no doubt, if carried, give more recognition to our profession. That, if not all that we want, will be a step forward that may lead to greater advantages in the future. I see the advantage has been advocated of an architect sitting with a judge in building actions. I have had the pleasure of acting in this capacity, and I am sure you will agree with me that if this form of tribunal was the custom litigation would be shortened and, perhaps, in some cases more justice would be done. I understand that litigants can apply to a judge to have an assessor appointed; the suggestion need not come from the judge. I believe in Italy the Court keeps a list of architects to whom they apply when requiring assistance. We are naturally anxious that this Institute should have permanent representation on the Council of the R.I.B.A., being the only allied society representing Ireland. Some time ago I attended the Council of the R.I.B.A. and put this matter strongly before them. My suggestion was well received, but great bodies move slowly, and the matter was referred back to a committee.

[*** In consequence of pressure on our space several reports of meetings of architectural societies are held over until next week.—ED.]

ENGINEERING SOCIETIES.

The Society of Engineers (Incorporated).

The annual general meeting of the Society of Engineers (Incorporated) was held at their offices, No. 17, Victoria-street, on Monday, the 8th inst., the President, Mr. Arthur Valon, M.Inst.C.E., being in the chair. The result of the postal ballot for the election of the Council and Honorary Officers for 1914 was announced as follows:—President, Mr. H. C. H. Shenton; Vice-Presidents, Messrs. Norman Scorgie, T. E. Bower, Percy Griffith; Members of Council, Messrs. Henry Adams, C. T. Walrond, Henry C. Adams, S. Cowper-Coles, B. H. M. Hewett, F. H. Hummel, G. A. Becks, C. W. B. Biggs, W. B. Esson, F. L. Ball; Associate Member of Council, Mr. R. J. Simpson; Hon. Secretary and Hon. Treasurer, Mr. D. B. Butler.

It was announced that the following premiums had been awarded for papers published in the Society's *Journal* during the current year:—

The President's Gold Medal to Dr. Eric K. Rideal, Ph.D., M.A., for his paper on "The Corrosion and Rusting of Iron."

The Bessemer Premium of books and instruments to the value of £5 5s., to Mr. Bernard L. Rigden, for his paper on "The South-Eastern Coalfield."

The Clarke Premium, value £5 5s., to Mr. Gerald O. Case, for his paper on "Accretion at Estuary Harbours on the South Coast of England."

A Society's Premium, value £3 3s., to Mr. Wm. Yorath Lewis, A.M.I.Mech.E., A.M.I.E.E., M.Am.Soc.C.E., for his paper on "The Bus v. Tram Controversy and Other Aspects of the London Traffic Problem."

The Report of the Council dealt with the many activities of the Society, and referred particularly to the consideration that is being given to the status of the engineering profession. Engineers are invited to submit to the Council particulars of cases coming under their personal observation in which the interests of the

profession generally or of engineers individually have been prejudiced; for example, the practice of obtaining competitive quotations for fees from a number of engineers, the advertising of "competitions" for engineering designs, the acceptance of designs as well as tenders from engineering firms without competent and independent professional advice, the under-payment of municipal engineering officials, and other similar practices affecting the profession. All such information will be treated confidentially.

THE ROME SCHOLARSHIPS.

THE work submitted by students for the Final Competition of the Rome Scholarships in Architecture, Sculpture, and Painting, together with some of the work submitted in the preliminary competitions, has been on view at Burlington House.

The subject set for the Final Competition in Architecture was a Forum or Civic Centre for an Important City, the scholarship being open to students of British nationality under the age of thirty. The sketch design on which the final design was based had to be delivered up at the end of the first day, and the designs submitted were executed in a period of three weeks after the submission of this first sketch. This circumstance has, we consider, to be borne in mind in criticising the result of the competition, which constitutes an unusually severe test for any designer.

The subject also largely accounts for the great variety in the accommodation selected by each competitor. Such a group of buildings would in reality consist of a great deal of detailed accommodation for each department, and the impossibility of considering this in the time allotted has led most of the competitors to conceive their designs as architectural monuments containing halls and staircases, it is true, but little in the shape of what would in reality be most wanted in such buildings—suites of office rooms—so that with the exception of Mr. Edward Wylie, who has conscientiously set himself something like the full practical subject suggested, the designs are mostly essays in general architectural design. Whether this is a defect or otherwise we are not prepared to say without more consideration, but it is a reflection which will occur to most of those seeing the work exhibited.

The winner, Mr. H. C. Bradshaw, has submitted a finely-conceived scheme in which the various buildings form a long oblong, with a semicircularly-disposed arrangement of buildings forming the culminating feature at one end of the oblong.

We illustrate the detail, general view, and plan of the scheme, which shows the influence of the Liverpool School of Design in detail. The drawings are excellently and sympathetically rendered, and the whole scheme masses well.

Mr. Louis de Soissons, to whom is awarded the Jarvis Studentship, submits a scheme in which the buildings are arranged as before, round an oblong quadrangle, but in which the chief feature—the Foreign Office—occupies one of the longer sides of the quadrangle. A defect of the scheme is, to our mind, the divergency in treatment between the two shorter sides of the rectangle. The design, which is carefully detailed, though a little commonplace, is, we consider, more pleasing in its frankly Renaissance detail than that of the winner.

Mr. Ernest Cormier places his buildings on the edge of a lake, and, like Mr. Soissons, places the chief feature on one of the longer sides of the rectangle. The detail of a Neo-Grec type is interesting and pleasing.

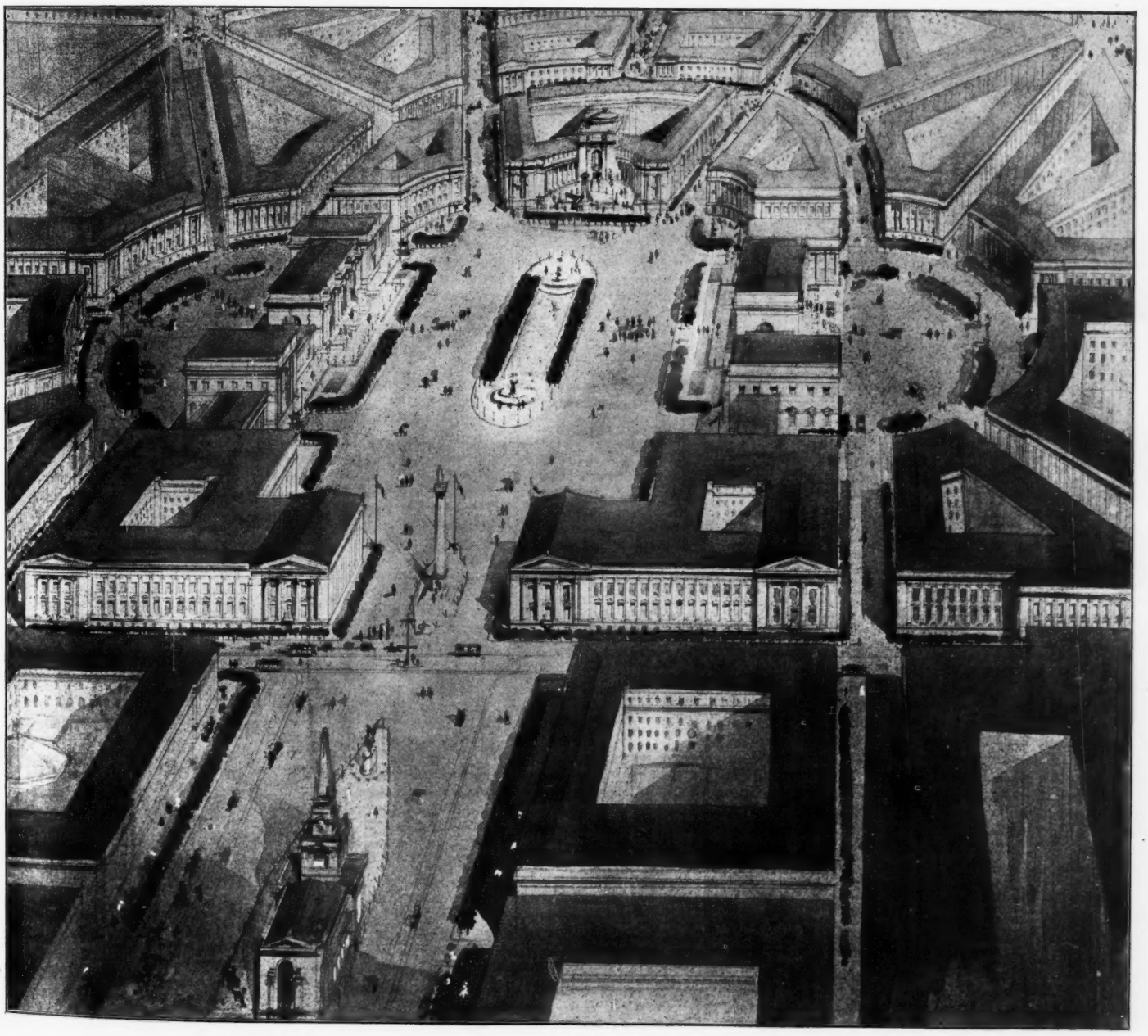
The student who, it seems to us, shows the greatest grip and power of combination in design is Mr. T. Braddock, who has drawn his inspiration from Rome itself. The high central mass is delightfully composed and well set off by the treatment of the semicircular hemicycles with which the sides of the group terminate. The detail is far more English than that of the before-mentioned designs, and shows a want of experience; but, apart from this and the execution of the drawings, we consider this the finest design submitted.

It is interesting to note a similar mastery of massing and grouping in the design submitted by Mr. Braddock for the preliminary competition for a Technical University.

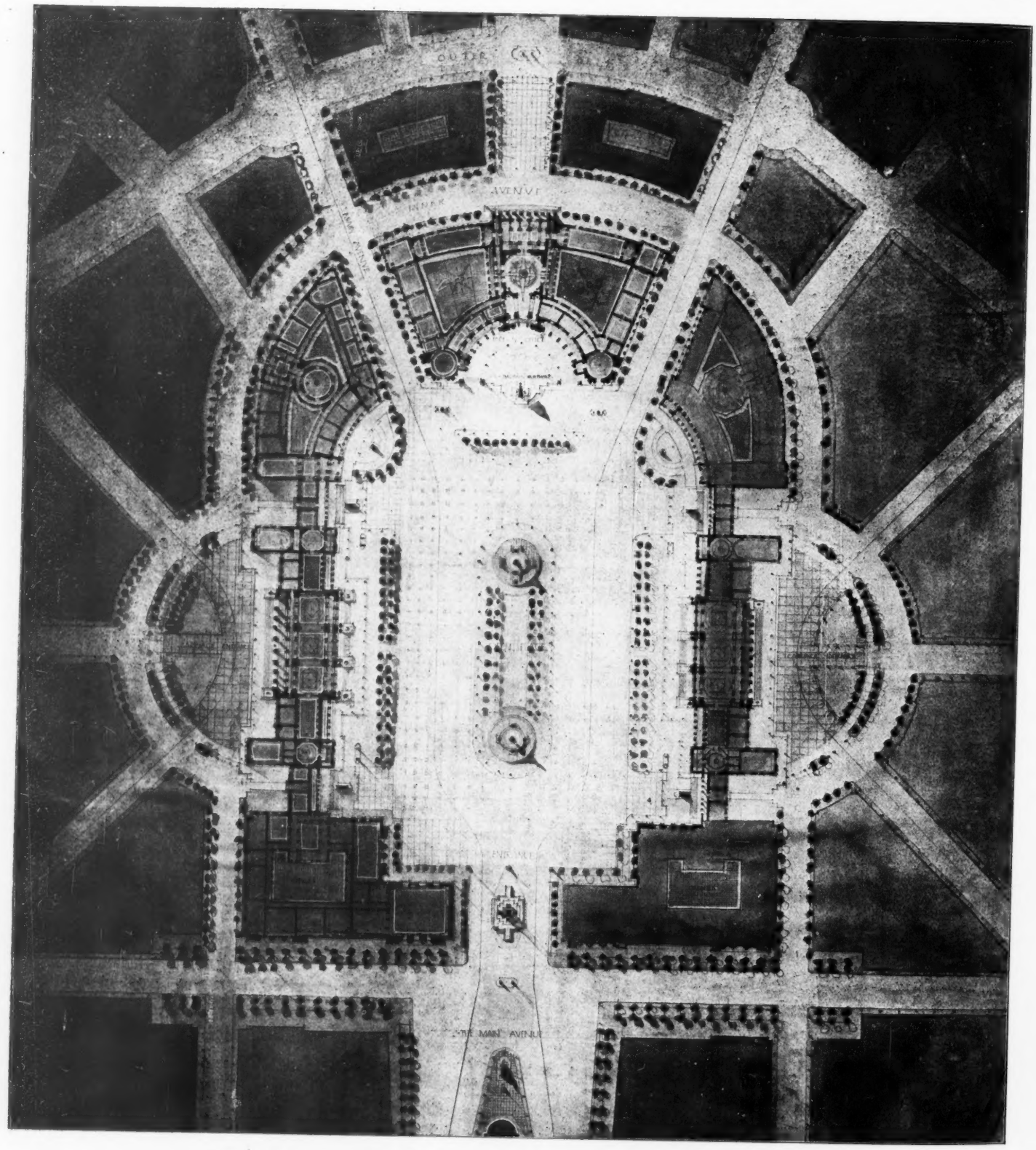
Mr. Harding Thomas's scheme is spoilt by the lack of cohesion, the angles of the group being bound together somewhat weakly by thin-looking screens of columns; while Mr. Edward Wylie has hampered himself by his careful endeavour to consider the probable requirements of each group of buildings which he has planned.

The preliminary designs of the students mentioned—a Technical University—are interesting and good studies in design, and show the effect of the more classical influences now at work in architecture.

The work submitted for the Sculpture Studentship reaches a very high level indeed



A Civic Centre, or Modern Forum, surrounded by Important Public Buildings.
Rome Scholarship in Architecture: The Final Competition. Winning Design.
By Mr. H. C. Bradshaw.



A Civic Centre, or Modern Forum, surrounded by Important Public Buildings.

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and we illustrate the standing figure for a fountain submitted by the winner, Mr. Gilbert Ledward, and by Mr. Charles S. Jagger, and also the studies in bas-relief submitted by them. We may add that, while the winner's work shows the greatest mastery, Mr. Jagger's model sketch of the fountain is a piece of much better imaginative design than that of his rival.

The work submitted for the Scholarship in Painting is disappointing; but the winning design, by Mr. Colin Gale, is certainly the best of those submitted.

DESIGN FOR BROAD-WALK ENTRANCES.

The London Society is offering the Gold Medal of the Society and £15 for the best design submitted for the improvement of the north and south entrances to the Broad-walk of Kensington Gardens. Competitors are to deliver their designs on or before Wednesday, March 11, 1914, to the Secretary of the R.I.B.A. The award will be made by a Committee appointed by the Council of the R.I.B.A.

ARCHITECTS' AND SURVEYORS' APPROVED SOCIETY.

MR. W. E. WOOLLEY (President of the Surveyors' Institution and also President of the Architects' and Surveyors' Approved Society) took the chair on December 18 at the rooms of the Architectural Association at the annual general meeting of the above Society. Mr. W. Curtis Green (President of the Architectural Association) wrote regretting his inability to be present. He said he was very gratified at the result of the first year's working of the Society and was glad to feel that the Association had been able to assist this. He sincerely trusted that the Society would continue to prosper.

Mr. F. R. Yerbury (Secretary) read the following statement of the progress and work of the Society:—"At the first general meeting of the Society, held last December, it fell to my duty to briefly outline the reasons which had actuated those interested to form this Society and also to give a few details of the position o the newly-formed Society at that date. The prospects of the Society were then perhaps merely a matter of conjecture, well-founded conjecture maybe, seeing that the Society had made remarkable progress during the very short time it had then been in existence, but it is now possible after a year has elapsed to compare our anticipations with actual experience, and I am glad to say the comparison is an exceedingly gratifying one. The Treasurer will give you some information as to our financial position, and I therefore propose to confine myself to the details in connection with the working of the Society.

The membership has steadily increased, and we have since the last meeting enrolled 404 members. We have lost ninety-nine members, one, I regret to say, by death, the majority of the remainder resigning on account of their incomes rising beyond the Insurance limit. A few members have gone abroad, and three have transferred to other professional societies owing to a change in their professions. We now have 1,879 members on our registers. The sickness

and maternity claims have been far below the number estimated by the Government actuaries. Up to the present we have met twenty-five maternity claims, and 115 members have received sickness benefit. Two members have received sanatorium benefit.

I am glad to say that most of the claims dealt with were for illnesses which may be regarded as not being serious, and at the present time there are only six members on the sick list, one lady and five gentlemen.

The Committee of the Society has endeavoured to be of as much assistance as possible to those of its members needing its help, and it has been able in many cases to render services not by any means required by the actual letter of the National Insurance Act. Wherever possible members in hospital have been visited, and they have been invited, as indeed all members of the Society are invited, to regard the Committee as a body prepared and anxious to assist them in any way which may be in their power.

A Benevolent Fund has been formed for the benefit of members requiring it. Happily very few cases of distress have as yet come before the Committee, but it is felt that the existence of such a fund will be a great asset to the Society, and will enable the Committee to give financial assistance, when necessary, beyond the monetary benefits to which members are entitled under the Act.

A scheme for dealing with this Fund in other ways is at present under consideration.

Mr. Maurice E. Webb referred to the financial position of the Society, and said that as soon as the Government officials had passed their accounts they would be circulated. It might be a matter for criticism that the amount spent on administration exceeded the amount paid out in benefits very considerably. He need hardly point out, however, that the administration covered the whole year, whilst the sick benefits had only been payable for six months. In addition to that, about £ 00 of the administration expenses went on the preliminary organisation of the Society, and that was paid by the Royal Institute of British Architects and other associations. Therefore, so far as the Society was concerned, their administration was really remarkably low. After the first year they were allowed 3s. 10d. per head for administration, and, so far as they could see, they ought not to exceed 3s. The benefits also had been very low. Government actuaries had worked the probable benefit at 3d. per head per member, but in their Society it had worked out at something under 1d., and if that continued it was bound to be for the benefit of the Society. Mr. Webb concluded by proposing a hearty vote of thanks to Mr. Reginald Blomfield, F.R.I.B.A., the retiring President.

The motion was carried.

The President, in moving the re-election of the Committee, said that one thing which stood out in the working of the Society was that only two persons received any remuneration. The working of the Society was extremely satisfactory, and everyone seemed to have put their back into it and did what they could to get the matter forward. So far as he was concerned he would be glad to do all he could for the Society.

The motion having been carried,

Mr. Geo. Corderoy (Chairman of the Committee) said that when the Society was formed he predicted that the funds available for benefits would be higher than in most other approved societies owing to the fact that the health of the members would generally be good, and, further, that so many would be constantly passing out of it owing to increased salaries. These anticipations had been amply fulfilled. With regard to their expenditure, it had actually been 2s. 5½d. per head. Every member of the Committee had given his services freely, and no one had taken any of the fees or expenses to which they were entitled. The Architectural Association had also greatly assisted them by giving the offices free. He would also like to refer to the work of the Secretary. It was true that Mr. Yerbury received a modest salary, but he did a great deal of work, which was not covered by any remuneration which they could pay. In particular he greatly appreciated the visits of inquiry and encouragement which Mr. Yerbury paid to members who were sick or in difficulty, and the careful personal touch which was kept with the members of the Society. There was very little "red tape" in the Secretary's administration.

On the motion of Mr. G. Reeves, seconded by Mr. W. J. Fisher, the rules were amended in several particulars.

On the proposition of Mr. R. Ellis a vote of thanks was passed to the Architectural Association for the assistance they rendered the Society.

Mr. T. J. Carless (President of the Quantity Surveyors' Association) proposed a vote of thanks to the Chairman, and this was seconded by Mr. Geo. Hubbard, F.R.I.B.A., and carried.

The Committee is very anxious to increase the annual income of the Benevolent Fund, and it invites subscriptions from architects and surveyors. Already a number of gentlemen are supporting the fund by subscribing amounts from half a guinea upwards per annum.

The value of the work of this Society can be considerably increased by the existence of a strong Benevolent Fund, which will enable the Committee to give financial assistance in cases where it is necessary, beyond the allowances of the National Insurance Act.

NEW BUILDING, PICCADILLY.

Demolitions are proceeding at 1, Park-lane, Piccadilly, and on this corner site a new building will be erected from the designs of Mr. Delissa Joseph, F.R.I.B.A., Portland House, Basinghall-street, E.C.

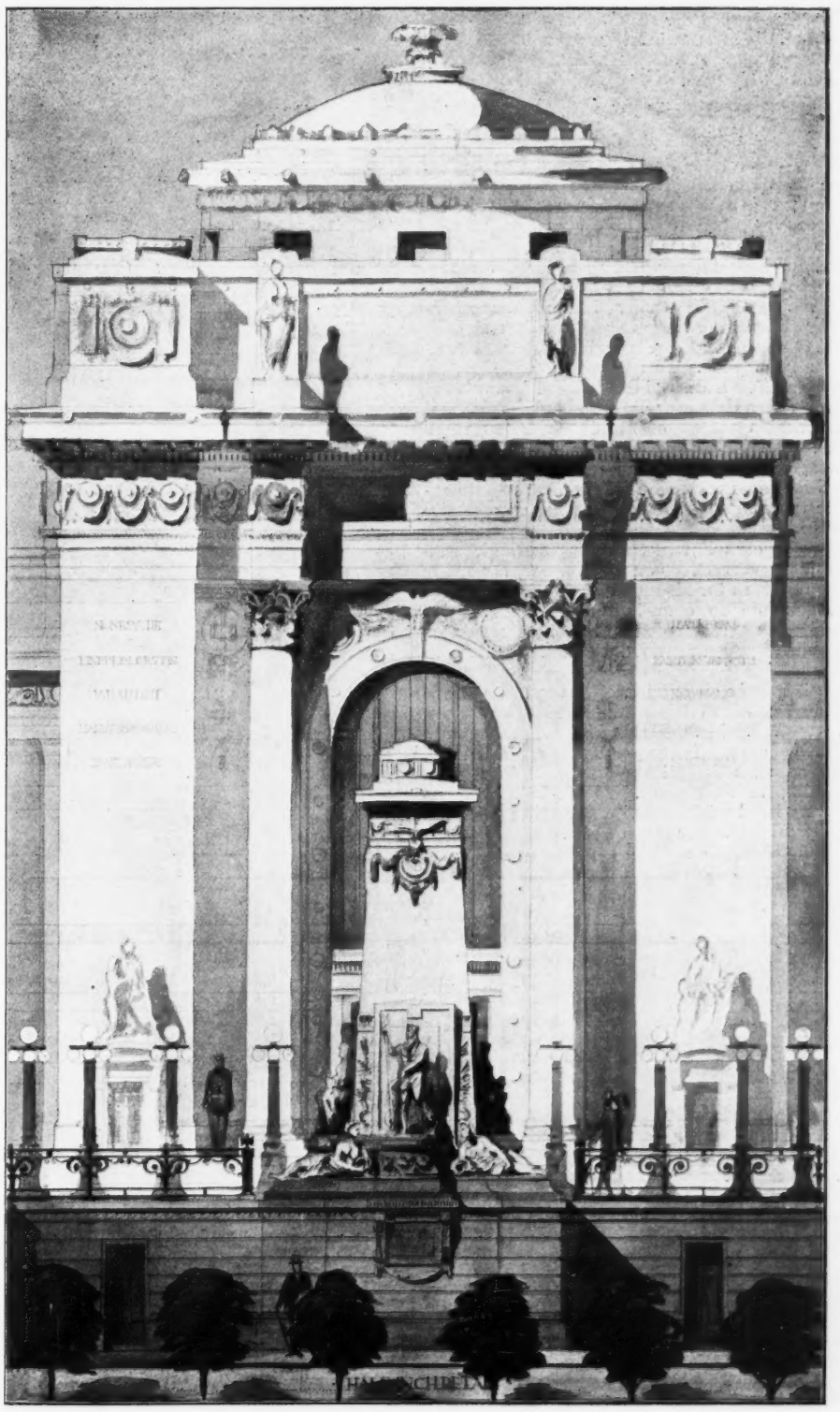
CORRESPONDENCE

Licentiate R.I.B.A.

SIR,—With Registration in the air and proposals to form a body of chartered architects, one is often reminded that Licentiates were brought into the Institute to strengthen its hands with that main object in view; but have they been brought in? If one is to judge by recent utterances they are still outside, and would not only remain there if some people had their will, but would, I am thinking, be chained up and labelled dangerous, for the offence, it would seem, that they are a large family.

At the moment Licentiates have reason to feel sore from a series of pinpricks, certain warnings having appeared in the *Journal* reminding them of the pains and penalties that await them if they do not write the affix Licentiate R.I.B.A. in full after their names. This warning has not only appeared in large red type, but, as if that were not sufficient, it has since taken precedence after the great seal.

The Licentiate class was built up after much pains and trouble, and it follows as a matter



The Foreign Office and Monument.
Rome Scholarship in Architecture: The Final Competition. Winning Design. (*See p.* 699.)
By Mr. H. C. Bradshaw.

of course that any harsh treatment meted out to it must shake it to its very foundation.

It does seem very absurd that while the surgical, medical, dental, musical, and other professions allow their Licentiates to use the first letter only, the R.I.B.A. insists on the whole word.

Whether By-law 24 says so or not seems immaterial, because when this by-law was approved by the Privy Council it is doubtful whether they fully realised its anomaly or import. It will be necessary when approaching them again to have this matter brought very clearly before their notice. Anyway, under the law of equity I doubt if it could hold good, being so signally arbitrary and foolish and simply tending to make one body of men appear ridiculous in the eyes of their fellows.

However, the public will have nothing to do with it, and insist on using L.R.I.B.A., and, considering there is always the chance of a slip and writing it "Licentious," they are to be congratulated.

Again, the various architectural and building journals usually follow the same course. It would indeed be a serious matter for their editors if they too were warned to appear on the carpet and explain themselves.

One can just picture a poor overworked Licentiate being dragged before the court for failing to write the whole word and the tears that could not fail to start to the eyes of his judges when they saw their culprit rushed off to receive his unjust sentence. H. C. PULLIN.

The Cheap Cottage.

SIR,—After reading your remarks as to Mr. Arnold Mitchell's cottage in the *Builder* one is reminded of the gentleman who accidentally sat on what he supposed to be the hat of a friend. The episode struck him as full of food for amusement; but when he discovered the hat was his own it became a serious matter. So when we personally inspect a cottage designed for a mere labourer we may be delighted with the ample space provided by a sitting-room 9 ft. wide. But how would the matter strike us if we had to "inhabit there" ourselves? After all, a labourer is a human being, and the most eminent of architects is no more than that. It is one thing to pass through a cottage on a visit of inspection, quite another to dwell there permanently, and, as the unfortunate tenant may have to do, bring up a family wedged between the table and the wall, with the sole consolation that his landlord, who has just spent £2,000 on a motor-car, is getting a good return for his money.

Allow me to enunciate a golden rule for architects: "Never construct for other people dwellings you are not prepared to live in yourself."

It is merely an evasion of the points at issue to suggest that critics should visit the cottage in question. Mr. Morris, with whose letter I heartily agree, is an experienced architect, and as such is quite capable of judging a building from the plans. It will be little short of a national misfortune if cottages of this kind are realised all over the country.

We have often discussed the question of whether architecture is a profession or an art; we need trouble no more with such distinctions, for architecture, it seems, is to be a trade. What a delightful vista of possible developments unfolds itself—architects copyrighting each others designs and selling them at a guinea a time to be built where you please! And why stop at cottages? Why not the standard church, with tower, say, ten shillings extra? How refreshing it will be as we travel round to find all our old villages giving place to standard buildings and to recognise over and over again the standard cottage in the standard village! It might be well also to anticipate criticisms by marking the price in plain figures on the roof in every case. In the Wild West it has been found necessary at certain entertainments to protect the pianist by a notice requesting visitors not to shoot him as he is doing his best. And so critics of the £110 cottage may be disarmed by the conspicuous advertisement of its price.

Pending the arrival of this golden age, it would be interesting to inquire, as a mere matter of ethics, what is the opinion of the architectural profession as now constituted on the action of an architect who takes the plan of a contemporary, contracts it to impossible dimensions, and then copyrights it as his own? Am I entirely alone in thinking that such a proceeding should be condemned? Surely, since all that is good in the cheap cottage illustrated was conceived by Mr. Troup, some proportion of the guineas derived from its sale should go to him? But this may be, of course, an old-fashioned view, and quite out of date in these enterprising days. At least, one may hope that Mr. Troup may be allowed the special privilege of infringing the copyright of his own design. M. H. BAILLIE SCOTT.

[*** In printing this letter we do not, of course, accept responsibility for all the statements made in it. As for the plain answer which is asked for, if an income of fifteen shillings a week were all we had, we should prefer this cottage to one of ampler dimensions costing one shilling more in rent.—ED.]

"London Unique": *Re* St. Paul's Bridge.

SIR,—Supposing the decision should be to abandon the above scheme, there is an interim improvement possible, which would give improved facilities for north to south traffic in a great degree equal to the new bridge itself.

If a gap were made in the proposed line of the approach between St. Paul's-churchyard and Queen Victoria-street at Old Change-hill, there a short 60-ft. street could easily be formed, through the scheduled property, for direct communication between the above-named directions.

Ludgate-hill and New Bridge-street would then be relieved. Blackfriars Bridge is ample for all traffic, and would be quite as convenient as the proposed bridge for a large proportion of the traffic referred to.

By the suggested Dowgate-hill Bridge the distance for the traffic to a point where the lines of communication would intersect would be nearly the same.

The Dowgate-hill proposal would, however, be ever so much more convenient for and applicable to the City generally with its multitudes.

The position, it will be agreed, is a most natural one, and almost the same line has already been suggested by Professor Adshead.

As an initiative to action in the matter it may be mentioned that a copy of this correspondence is being forwarded directing the attention of the Prime Minister to the subject.

O. B. I. T.

MAGAZINES AND REVIEWS.

THE December number of the *Studio* contains an illustrated account of the very interesting series of studies for the mural panel representing the signing of Magna Charta which Mr. Frank Brangwyn has painted for the Court House at Cleveland, Ohio. "Seven Happy Days" is the title given to some dainty drawings by Miss Jessie King, executed in the etherealised æsthetic manner which is becoming a convention for the illustration of children's books—a convention, we may add, which has its distinct limitations as well as advantages. Mr. Mallows's "House of Craig-y-Parc," in South Wales, is illustrated by some pleasing drawings by the architect, in which the designer is somewhat torn between the rival claims of the picturesque and Renaissance tendencies; but the result is very pleasing, though we have a personal preference for a more emphatic acceptance of one standpoint or the other. Among other contents of an interesting number are some fine examples of wood engraving by J. Barrie Robinson.

The *New National Review of Commerce and Industry*, which is to be published monthly at 2s., and of which we have the first number before us, promises to be a useful review. It is edited by Mr. T. Swinburne Sheldrake. The aim of the new publication is to deal with international commerce and industry in the same way that other monthly reviews deal with politics, literature, social and religious questions. One of its principal features is to be a reliable monthly review in which the changing commercial and financial conditions in the principal countries in the world will be noted and explained. The first article deals with the markets of the world; and among other contributed articles we may note "Commerce and the Universities," by Professor Ashley, the Principal of Birmingham University; "Trade Routes as they will be Affected by the Panama Canal"; "Raw Cotton Supplies and their Effect on the Lancashire Industry," by the Secretary of the Manchester Cotton Exchange; "Oil Fuel and its Use for Steam Raising"; and "The Commercial Outlook in China." A synopsis of the commercial Press of the world is to be included in each issue

GENERAL NEWS.

British School at Athens.

Mr. A. J. B. Wace, M.A., has accepted the position of Director of the British School of Archæology at Athens. Mr. Wace is a corresponding member of the Imperial German Archæological Institute, and also a lecturer at St. Andrews University; this latter position, however, he is resigning consequent on his new appointment.

Liverpool Docks.

Liverpool Dock Board have dealt with a proposal to widen the entrance to the new Gladstone Dock at an estimated cost of £118,000. The entrance lock will be increased from 870 ft. to 1,070 ft.

A Queen Anne Column in the Strand.

It is stated that the British Museum has just acquired a drawing by James Gibbs which appears to be the only pictorial record of an ambitious but unsuccessful project for a London "improvement" of 200 years ago. The realisation of the scheme was thwarted by the death of Queen Anne in 1714.

The School of Oriental Studies.

The *Times* is informed that, pending the establishment of a governing body for the School of Oriental Studies, the responsibility of supervising the adaptation of the buildings of the London Institution for the purposes of the School has been entrusted by the Government to the Departmental Committee of the India Office presided over by Lord Cromer, acting in conjunction with the Office of Works. The Committee have approved the plans submitted by the architect, Professor F. M. Simpson, F.R.I.B.A. Some time must necessarily elapse before the working drawings are completed and the building contracts settled, but it is hoped that operations may be begun next April and that the work may be completed at the end of 1914 or the beginning of 1915.

English Woodland and Timber Industries Exhibition, 1914.

It is proposed to hold an exhibition of woodland and timber industries in London next year, under the auspices of the English Forestry Association. Invitations to co-operate will be extended to all bodies interested in the subject, and it is hoped to obtain the support of all concerned with English timber and underwood. A special feature of the exhibition will be practical illustrations, showing the men at work, of the woodland industries which the Association are organising and encouraging, and especially those dealing with the conversion of coppice and poles.

Church Building Society.

The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on the 18th inst. at the Society's House, No. 7, Dean's-yard, Westminster Abbey, S.W., Mr. J. E. Ollivant in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Newton, in Makerfield, All Saints, Lancs., £110; Preston, St. Cuthbert, Lancs., £100; and Twickenham, All Saints, Middlesex, £200; rebuilding St. Catherine's Church, Gloucester, £150; and towards enlarging or otherwise improving the accommodation in the churches at Coelbren, Brecons., £25; Creswell, St. Mary Magdalene, Derbyshire, £75; Haggerstone, St. Augustine, Middlesex, £20; Llandaff, All Saints, Glam., £80; Low Moor, St. Mark, Yorks, £30; Preston, St. Augustine, near Brighton, £50; Ramsay, St. Michael, Essex, £50; Rugby, St. Matthew, £35; Seal, St. Peter, Kent, £40; and Strata Florida, Cards., £25. A grant of £10, making in all £50, was also made from the Special Mission Buildings Fund towards building St. Luke's Mission Church, Ushaw Moor, Co. Durham. The following grants were also paid for works completed:—Clacton-on-Sea, St. James, Essex, £200; Bristol, St. Ambrose, £175; Groton, St. Bartholomew, Essex, £5; Chesterfield, Christ Church, £60; Whitchurch, St. John, Bucks., £50; Llanddewi Brefi, St. David, £20; Norbury, St. Stephen, Surrey, £50; Redberth, St. Wales, £25; Helsingham St. John, Cumberland, £75; Brigsley, St. Helen, near Grimsby, £15; and Bruntcliffe, St. Andrew, near Leeds, £35. In addition to this the sum of £189 was also paid towards the repairs of nine churches from Trust Funds held by the Society.

Chancery in the Palace, from "Great Catherine," Vaudeville Theatre.

ARCHITECTURE AND THE STAGE.

AT the Queen's Theatre Mr. Hale Hamilton is presenting the latest comedy imported from America, "The Fortune Hunter," by Winchell Smith, the author of "Brewster's Millions." The plot is more or less original. Nathaniel Duncan has so far failed to earn a living, but his prospering friend, Kellog, suggested to him a way of becoming a millionaire in a few months. If he will only follow out certain rules and live in a small out-of-the-way town, he will reverse the usual order of things and get the wealthiest girl in the town to propose to him. Whether he cares for her or she for him does not seem to matter much. Now, taking this seriously, one might have a good deal to object to, but we do not think the author wants to do more than provide a few hours' amusement such as mild wit assisted by good acting can provide. Good acting Mr. Hamilton and his company certainly do give us, and perhaps on this account one regrets a little that the play is not of a higher order. We should be inclined to call it a farce, not comedy, but we confess we think the fun is "just fine."

The scenery does not call for much comment, with the exception of the first act, which plays in Kellog's room. This is decorated and furnished in very good taste in Chippendale Chinese style, which nowadays is receiving a large measure of favour.

At the Vaudeville an amusing little play by Jerome K. Jerome, which is described as "an absurd play in four acts," is given under the title of "Robina in Search of a Husband." With the absurdity of the treatment of the subject we agree, but it is bright, amusing, and entertaining, with plenty of amusing situations. Miss Rowena Jerome acts the title *rôle* of Robina Penniciucque admirably, and is very charming and picturesque. Among the remainder of the cast may be mentioned Kate Gamlett, acted by Miss Winifred Beech; Horace Greenleaf, the solemn solicitor, a part well taken by Mr. Richard Evans; and an inimitable American, Amos Jordan, exceedingly well portrayed by Mr. Edmond Breon, who takes the part of the English officer in "Great Catherine." The scenery is pleasing and appropriate, the inn parlour being just the place we hope to find in our journeyings. We think the management are to be congratulated on the production of a piece which is safe to appeal to a house.

We have obtained a couple of photographs of the scenery in "Great Catherine," which we have already commented on, as we consider the scenery, which has been painted by Mr. Walter Hann & Son from designs by Mr. Victor MacClure, constitutes a great success. Both in colour and design it is extraordinarily successful, and forms a vivid and appropriate background to the dramatic action of Mr. Shaw's new play.

The Empress's Bedchamber, from "Great Catherine," Vaudeville Theatre.

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ILLUSTRATIONS.

A Town Hall for an Important City.

THE conditions were for a Town Hall 300 ft. square, with the areas of the various departments and principal rooms indicated. The grand staircases and entrances were asked for—one for the public hall and the other for the reception-rooms and Council Chamber suite.

It was thus necessary to place these apartments on the first floor.

The design, which won for the author the Royal Academy Gold Medal and Travelling Studentship in Architecture, is by Mr. D. J. Chisholm, A.R.I.B.A.

San Giovanni Battista, Ravenna.

ONE of the oldest churches in Ravenna is the basilica of San Giovanni Battista, erected in the fifth century A.C. by Baduarius for Galla Placidia.

It was almost entirely rebuilt in 1683 by Pietro Grossi.

The interior columns, with Corinthian caps, belong to the original church.

The tower is also of an ancient date—probably ninth century—and has the circular shape so frequently met with in Ravenna. The kind and proportions of bricks used show that its age is not so great as the campanilles of Sant' Apollinare Nuovo and Sant' Appollinare in Classe.

Gate of Ravenna.

This is one of the ancient gates of Ravenna.

Both the illustrations are reproduced from drawings by Mr. Harold Sund.

Sculpture Submitted for the Rome Scholarship Competitions.

WE illustrate the admirable figure designs submitted by Mr. Ledward and Mr. Jagger for the final competition, together with the bas-reliefs submitted by them in the first or preliminary competition.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE problems in design set by the Board of Architectural Education are as follows:—

The Examinations.

THE FINAL: ALTERNATIVE PROBLEMS IN DESIGN.

Instructions.

1. The drawings, which should be on uniform sheets of paper of not less than imperial size, must be sent to the Secretary of the Board of Architectural Education, Royal Institute of British Architects, 9, Conduit-street, W., on or before the dates specified below.

2. Each set of drawings must be signed by the author, and his name and address, and the name of the school, if any, in which the drawings have been prepared, must be attached thereto.

3. All designs, whether done in a school or not, must be accompanied by a declaration from the student that the design is his own work and that the drawings have been wholly executed by him. In the preparation of the design the student may profit by advice.

4. Drawings for subjects (*a*) are to have the shadows projected at any angle of 45 deg. in line, monochrome, or colour. Drawings in subjects (*b*) are to be finished as working drawings. Lettering on all drawings must be in a clear, scholarly character.

Subject XIII.

(*a*) A large Fireplace in the Main Reception-room of a Town Hall.

Drawings Required.—Detail drawings to ½-in. scale. Important details to 1-in. scale.

(*b*) A Single-Span Foot Bridge over a Stream 40 ft. wide, in any material that the candidate may select.

Drawings Required.—Detail drawings to ½-in. scale. Important details to 1-in. scale.

Subject XIV.

(*a*) Council Offices for a Small Town on an Open Site. The cost of the building not to exceed £15,000.

Drawings Required.—⅛-in. scale and ½-in.

(*b*) Completion of a Tower by a Lead Spire. The tower is 24 ft. square outside measurement, 60 ft. high to top of parapet. (Cornice and parapet not existing, but to be provided.) There is a newel staircase in the centre of one side of the tower.

Drawings Required.—⅛-in. scale and ½-in.

Subject XV.

(*a*) A Museum (detached) in the Park of a Country Town. The cost of the building not to exceed £15,000.

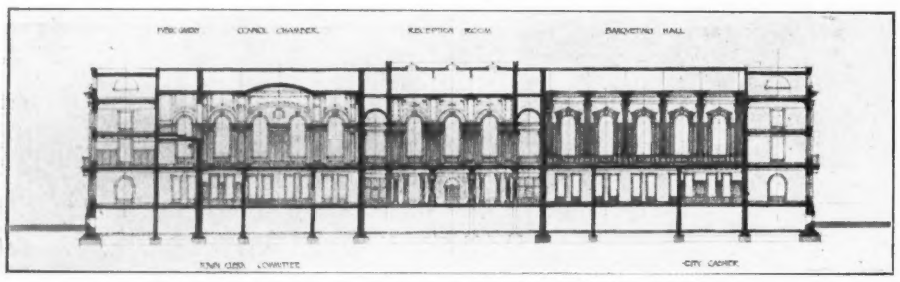
Drawings Required.—⅛-in. scale and ½-in.

(*b*) An Open Timber Roof to a School Hall, span 45 ft. The hall is 80 ft. long. One bay only to be shown.

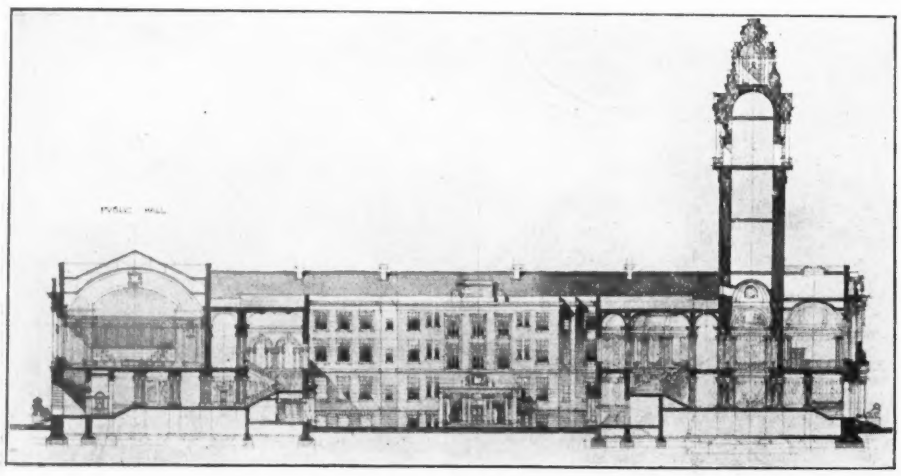
Drawings Required.—½-in. and important details to 1-in. scale.

Date for Submission of Designs in 1914.

	Subject XIII.	Subject XIV.	Subject XV.
United Kingdom	Feb. 28	April 30	June 30
Johannesburg	April 30	June 30	Aug. 31
Melbourne	May 30	July 31	Sept. 30
Sydney	May 30	July 31	Sept. 30
Toronto	March 31	May 30	July 31



Section through Principal Suite.



Section through Grand Entrances and Staircases.

A Town Hall for an Important City—R.A. Schools: Gold Medal Design.

By Mr. David John Chisholm.

FIFTY YEARS AGO.

From the *Builder* of December 26, 1863.

Temporal and Spiritual.

HERE are bricks and there is mortar for ye, build—
Build houses, castles, sanctuaries,
And idols for your joy.
There's colour, and there is gold for ye to gild
Your palaces, your statuary,
And Time will all destroy.

There is toil, and there is sorrow for ye, build—
Build, care, fear, and anxiety,
Till Death takes ye away.
There are foes in hate and jealousy so skill'd,
Can tarnish fame and glitterings,
And you'll have nought to say.

Here is truth, and there is wisdom for ye, build—
Build kindness, virtue, charity,
And for such works you may
Depend that there is much space which may be fill'd
With greater, stronger monuments
Than Time can wash away.

There is love, and there is mercy for ye, build—
Build holiness and righteousness
Till one continual day.
There have peace and everlasting life been will'd,
Eternal glory, happiness,
To those who build this way.

LOUIS DE VILLE, Architect.

*** The Christmas season produced poetry in 1863.—ED.

CARPENTERS' HALL LECTURES ON ARTS CONNECTED WITH BUILDING.

The following is the course of ten lectures to be given at Carpenters' Hall, London-wall, on Wednesday evenings at 7.45 p.m. on "Arts Connected with Building." The lectures are free by ticket:—January 7, Mr. M. H. Baillie Scott—"Building—a Creative Craft"; January 14, Mr. Thackeray Turner, F.S.A., F.R.I.B.A.—"The Craft of China Painting" (coloured slides); January 21, Mr. T. Stirling Lee—"History as Written in Sculpture"; January 28, Mr. F. Hamilton Jackson, R.B.A.—"Romanesque Ornament"; February 4, Mr. W. H. Ansell, A.R.I.B.A.—"The Origin of Form in the Building Crafts"; February 11, Mr. H. W. Cubitt, A.R.I.B.A.—"The Logical Treatment of Modern Construction"; February 18, Mr. Herbert W. Wills, F.R.I.B.A.—"The Case for the Jerry-Builder"; February 25, Mr. F. W. Pomeroy, A.R.A.—"A Talk on Sculpture"; March 4, Mr. Charles Spooner, F.R.I.B.A.—"Woodwork—Old and New"; March 11, Mr. Maurice B. Adams, F.R.I.B.A.—"Cottage Housing: Its Economic Limitations and Distinctive Character." The lectures will be illustrated by lantern photographs, etc.

DESIGN BY MR. C. S. JAGGER.

WINNING DESIGN BY MR. GILBERT LEDWARD.

THE ROME SCHOLARSHIP IN SCULPTURE: FINAL COMPETITION.

(A STANDING FIGURE FOR A FOUNTAIN).

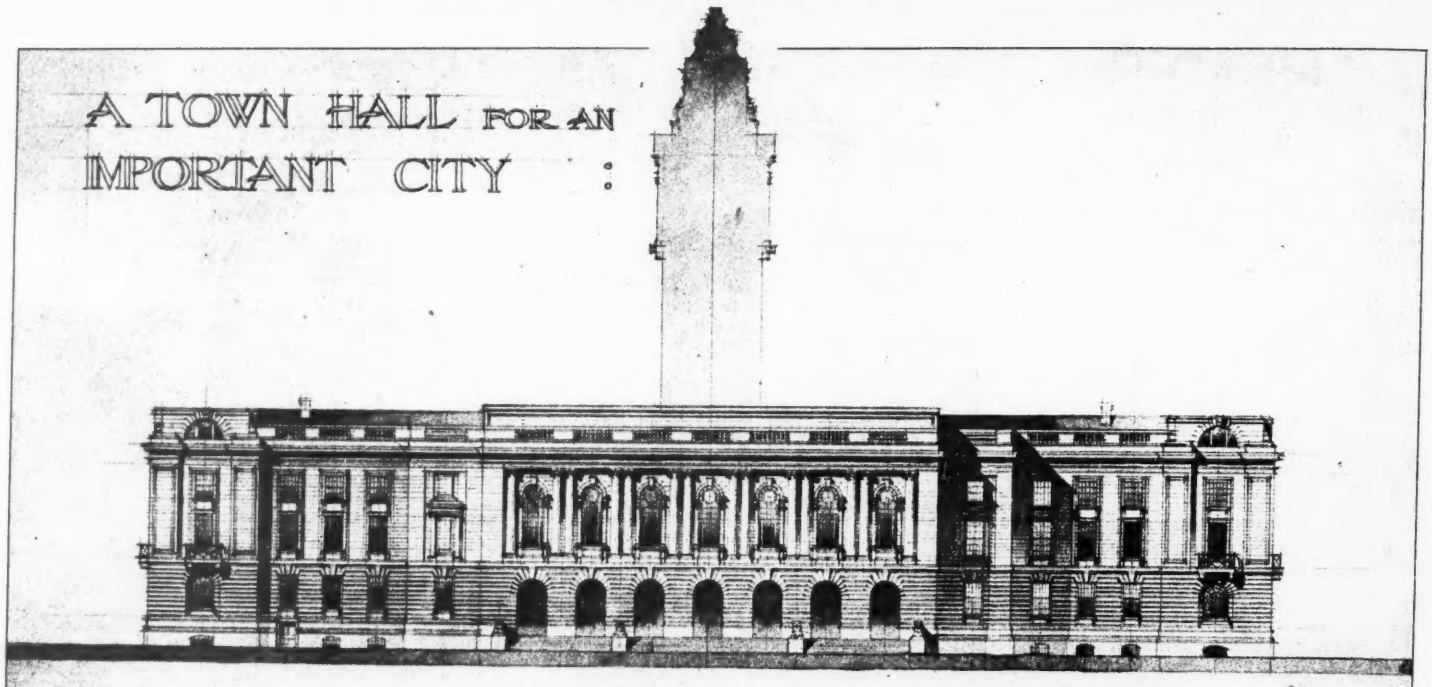
THE ROME SCHOLARSHIP IN SCULPTURE: FINAL COMPETITION.

(A STANDING FIGURE FOR A FOUNTAIN).

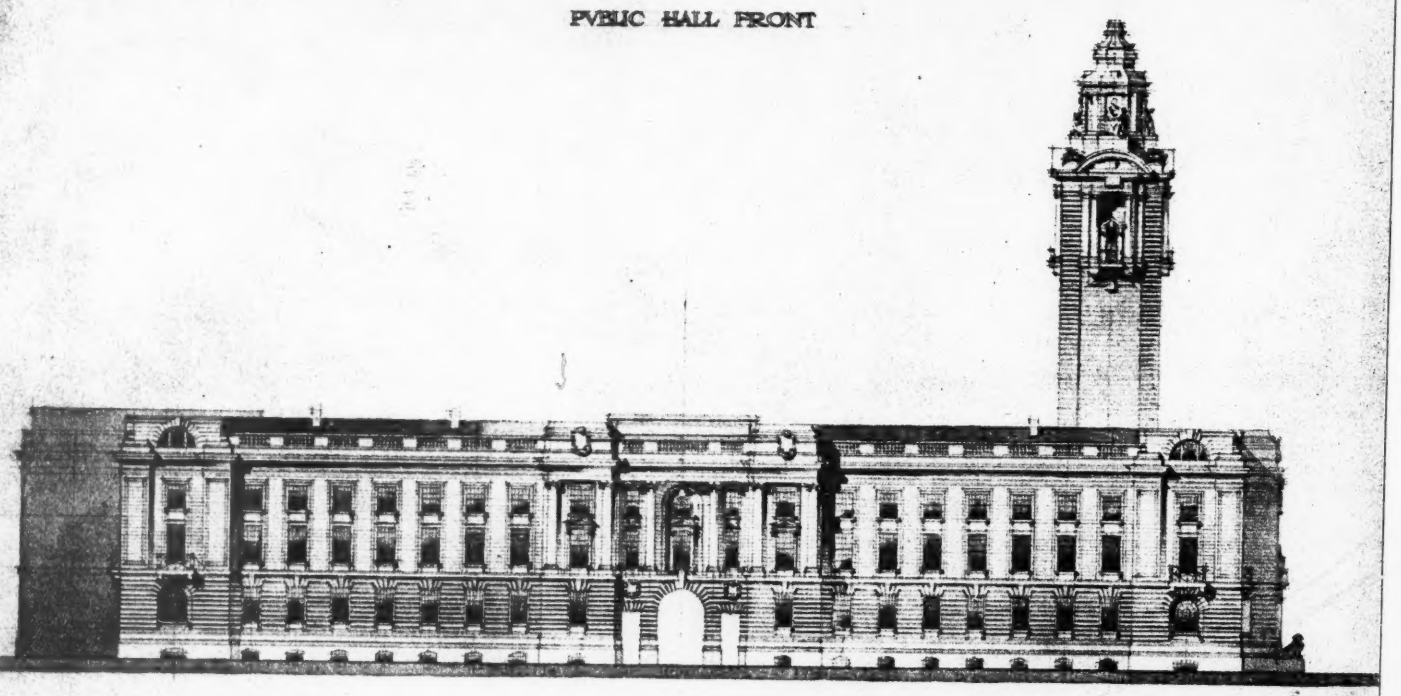
"INK-PHOTO" SPRAGUE & Co LTD 69 & 70, DEAN STREET, SOHO, W.

GATE OF RAVENNA.—From a Drawing by Mr. Harold Sund.

A TOWN HALL FOR AN IMPORTANT CITY :



PUBLIC HALL FRONT



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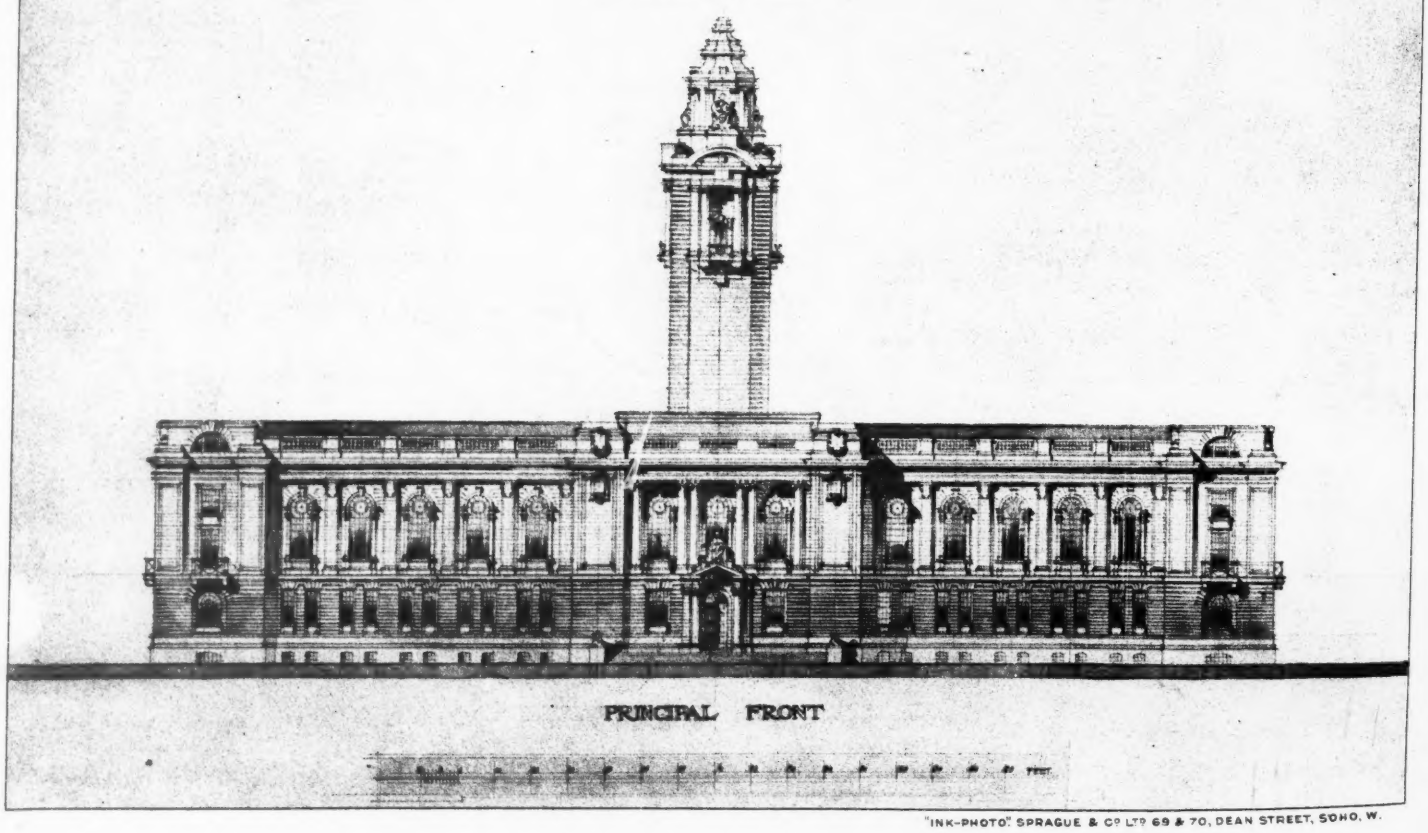

PRINCIPAL FRONT

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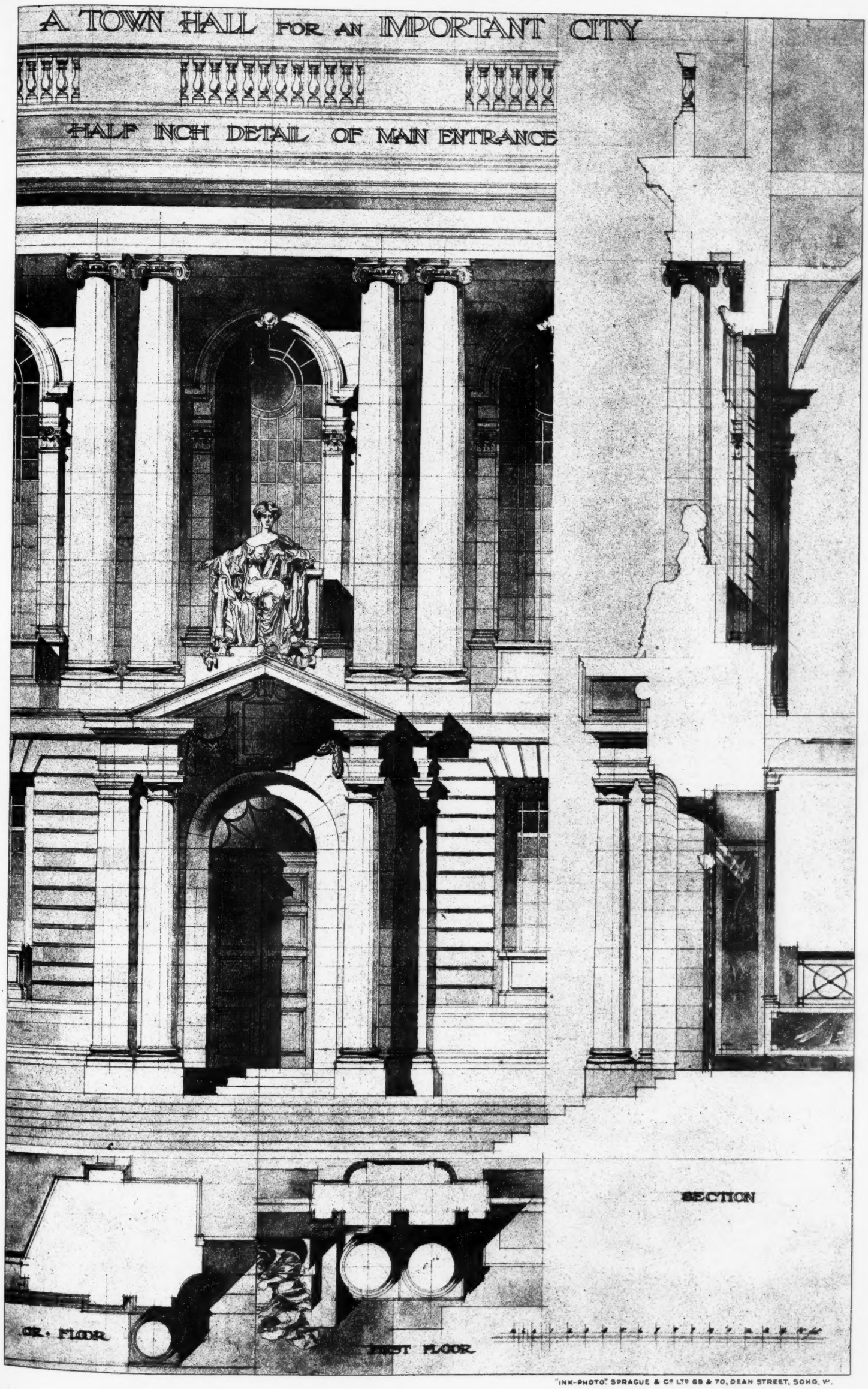
DESIGN FOR A TOWN HALL FOR AN IMPORTANT CITY.—By Mr. David John Chisholm.

R.A Schools, 1913, Gold Medal Travelling Studentship Design.



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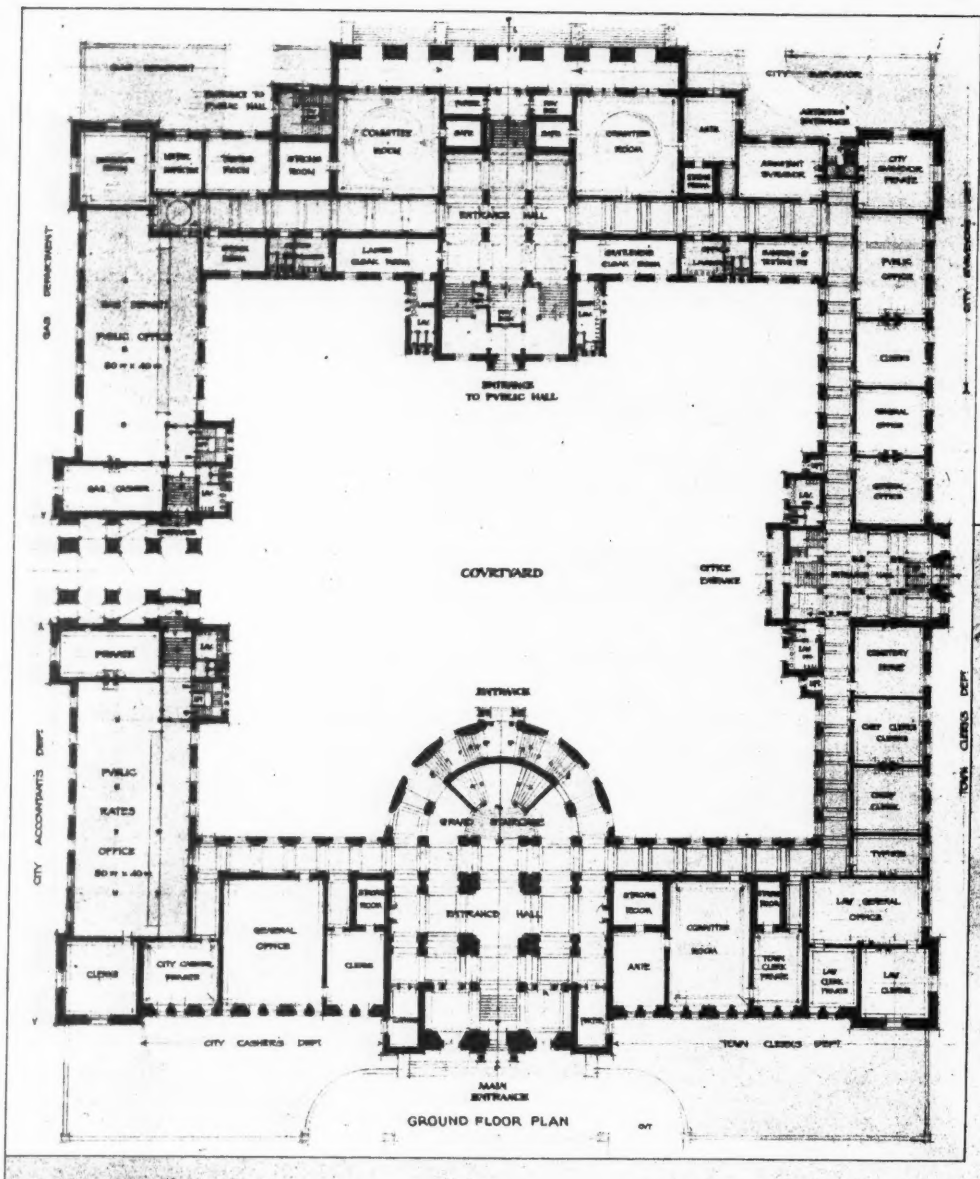

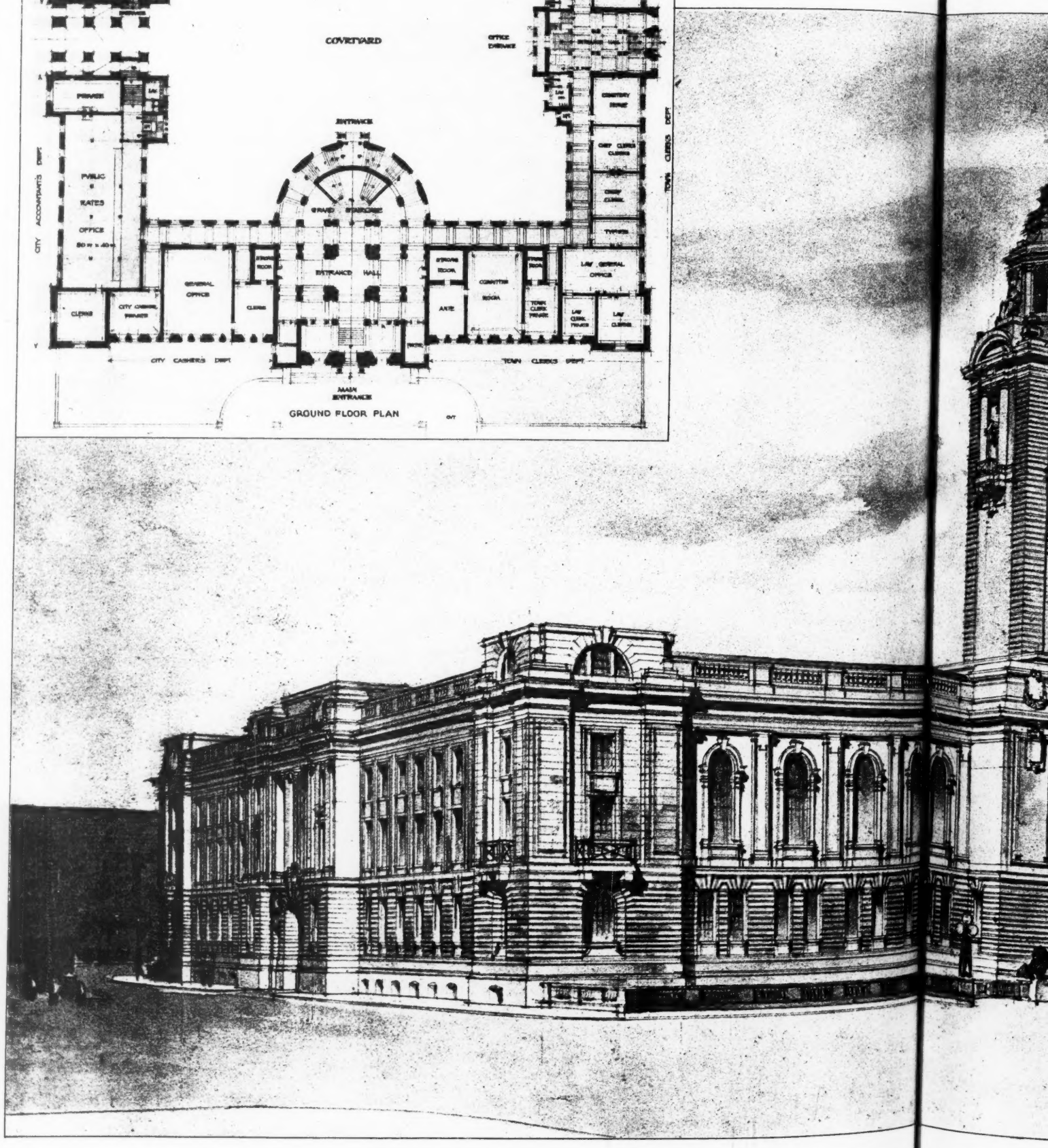

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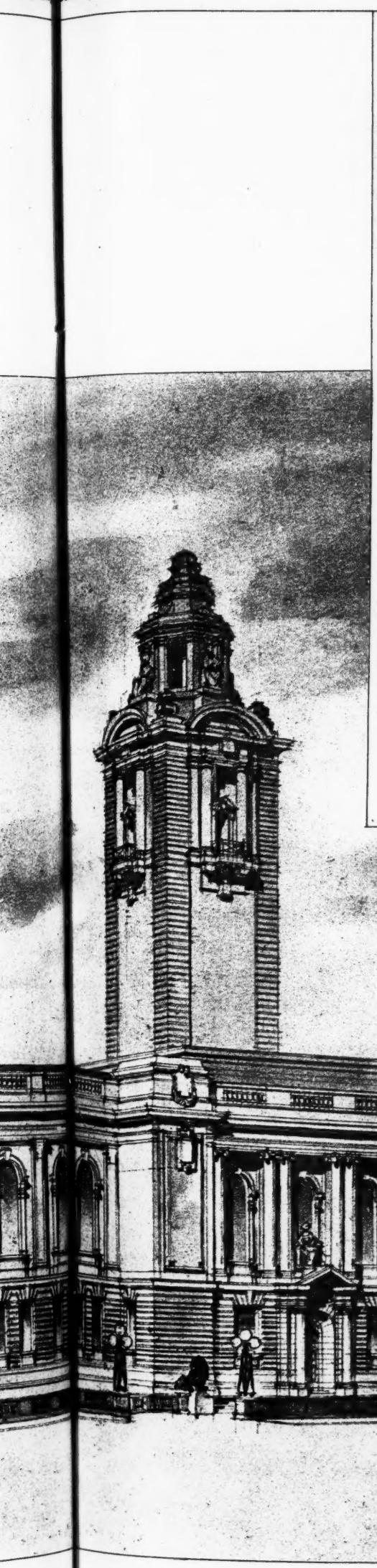

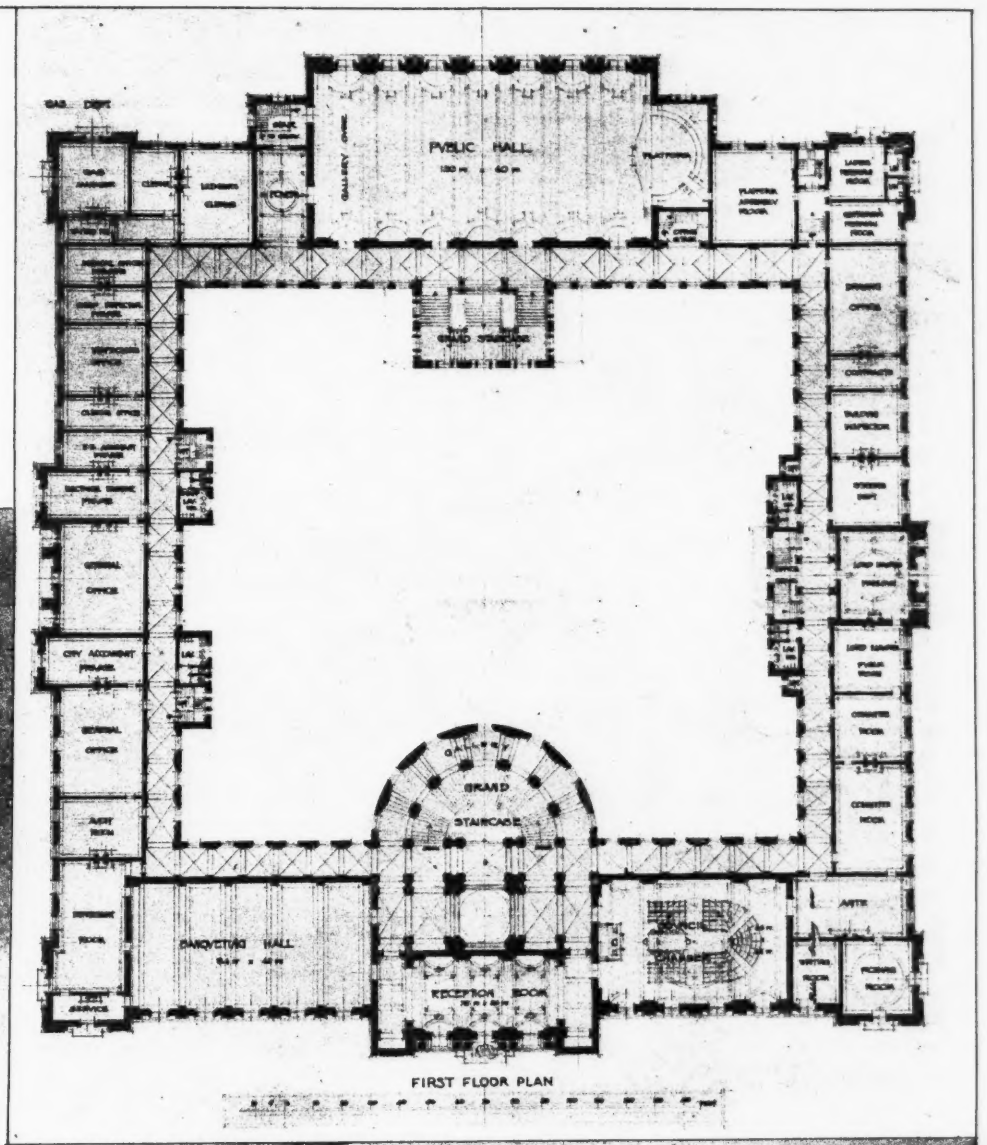

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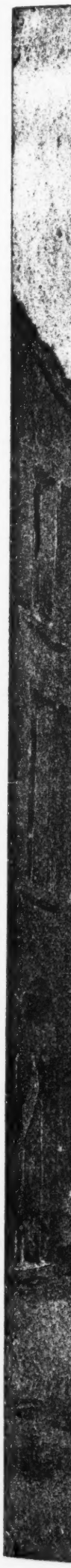
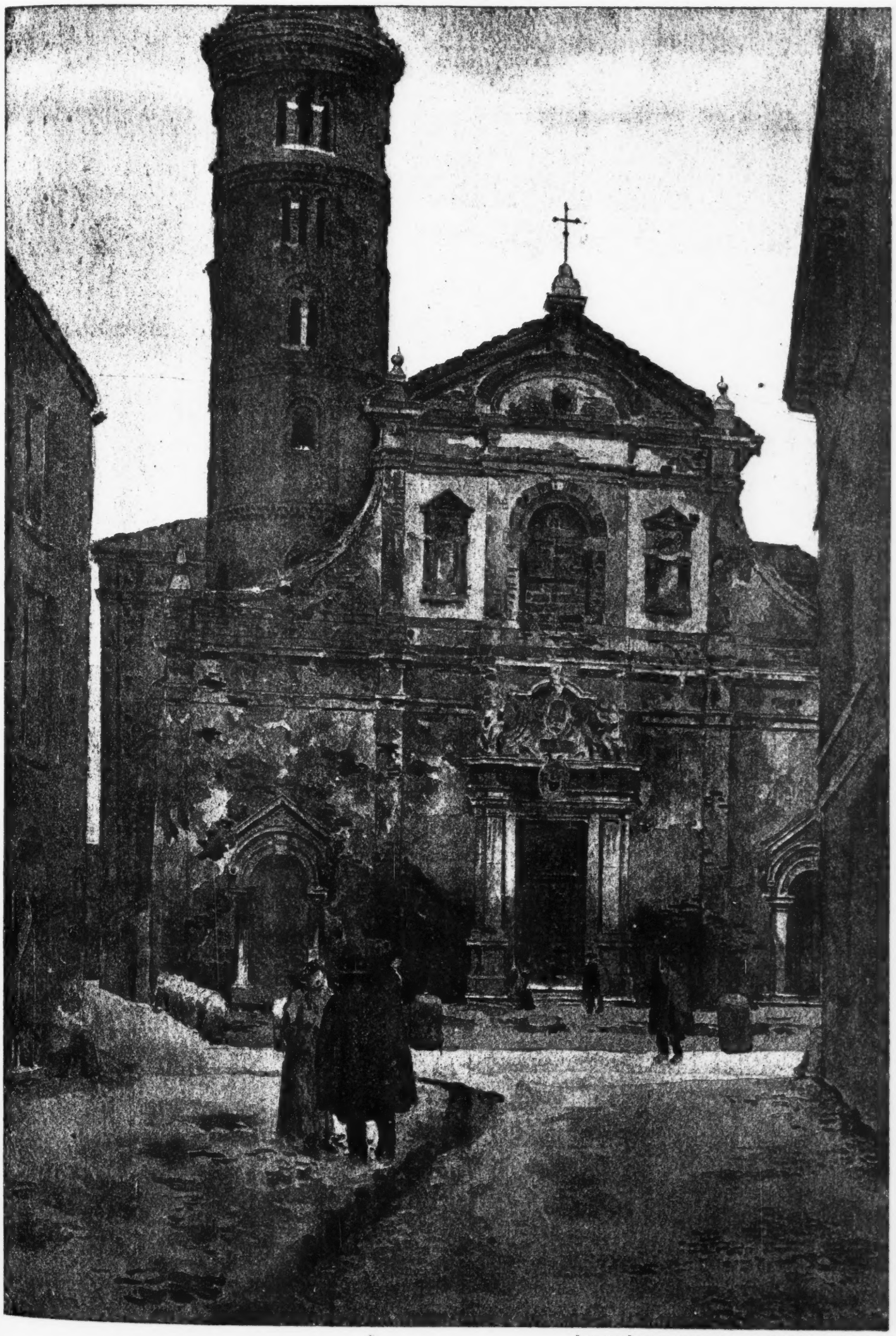
. FOR AN TANT CITY.—By Mr. David John Chisholm.





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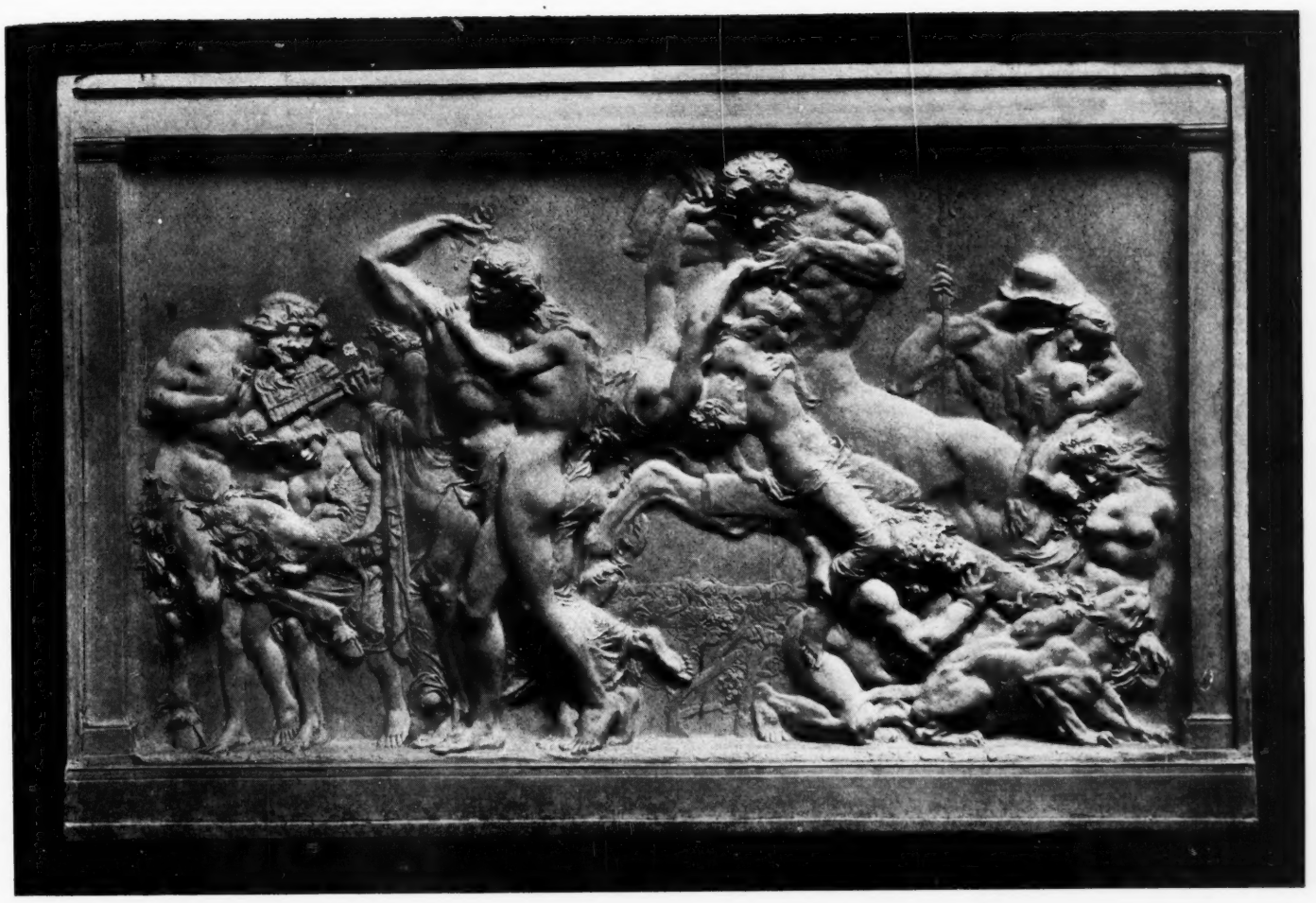
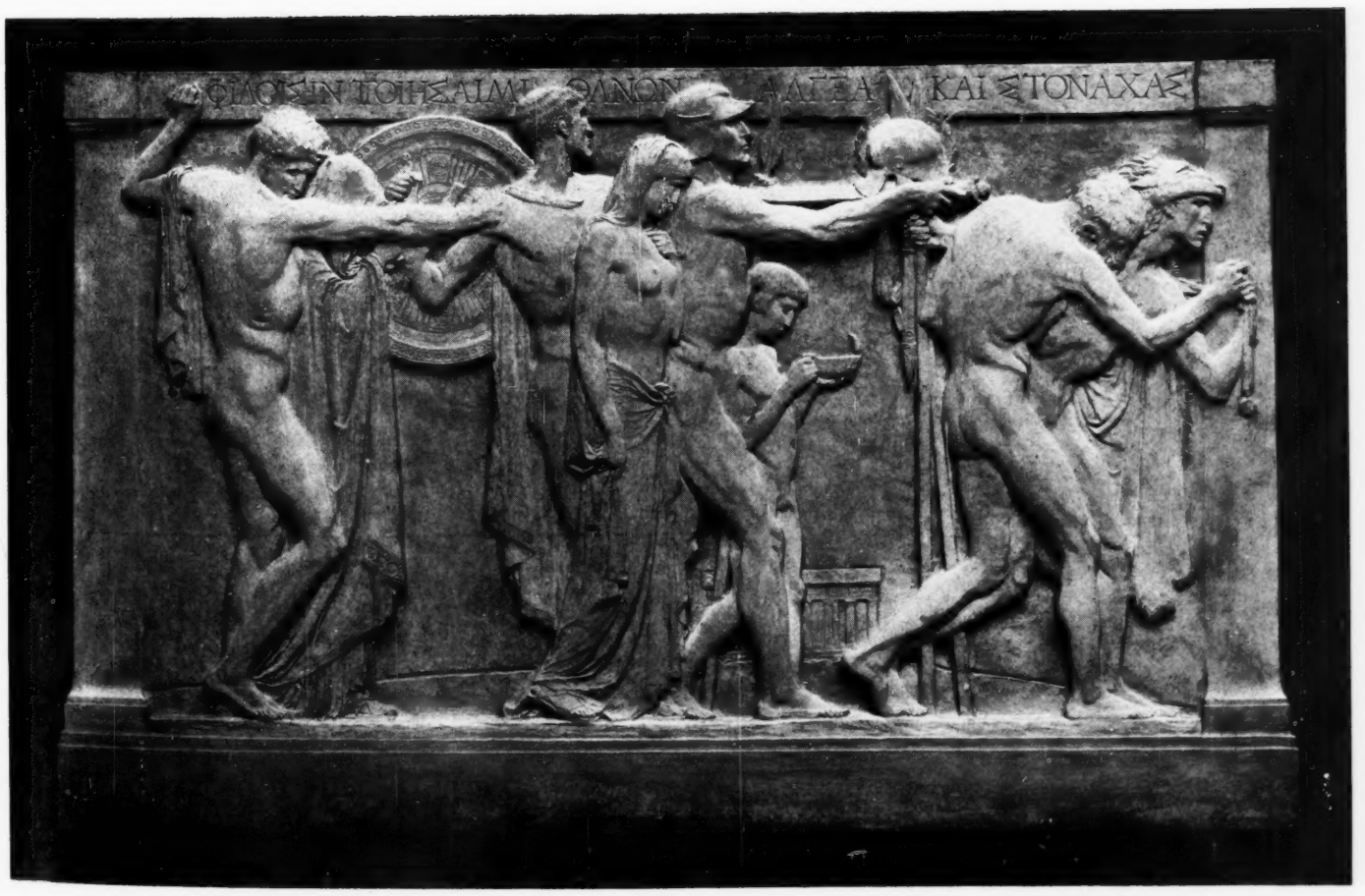
S. GIOVANNI BATTISTA, RAVENNA.—From a Drawing by Mr. Harold Sund.



DESIGN FOR FRIEZE, BY MR. C. S. JAGGER.



Sprague & Co., Ltd., 69 & 70, Dean Street, Soho, W

DESIGN FOR FRIEZE, BY MR. GILBERT LEDWARD.

THE ROME SCHOLARSHIP IN SCULPTURE; PRELIMINARY COMPETITION.

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LIGHTING, HEATING, AND SANITARY ENGINEERING SECTION.

THE EMPLOYMENT OF POWER IN H.M. POST OFFICE.

A PAPER entitled as above was read by Mr. H. C. Gunton before the Institution of Electrical Engineers on Thursday, December 18. It is full of interesting facts unknown to the general public and even to most engineers. For instance, how many are aware that the Post Office has its own electrical power-station at Blackfriars, with a normal full load capacity of 2,500 kilowatts, supplying three-phase current at 6,600 volts to substations at General Post Office West, King Edward Building, and Carter-lane? At the first it is converted to 220 volts three-wire direct current, at the second to 440 volts and 110 volts, and at the third to 110 volts.

As regards pneumatics, there are at General Post Office West four electrically-driven 240-b.h.p. air-pumps, in addition to many smaller plants in other places. It is stated that about 5-h.p. to 5½-h.p. is required to work a 2¼-in. tube, 1 mile long, at 10 lb. pressure, the time of transit of the carrier being two and a quarter to two and a half minutes. There are some tubes to the West-end of London over 2 miles in length. The details of working are very interesting, but space precludes any description of them.

Of electric lifts there are in Great Britain as many as 207, representing 1,669-b.h.p. motor capacity, including every kind of control, and worked off all kinds of electrical supplies. Most are on continuous current systems, but in King Edward Building there are twelve three-phase current lifts of from 5 cwt. to 5 tons capacity. It is considered that the capital cost of an electric litt is greater than that of an hydraulic lift except for very long travels whilst the average maintenance cost is not likely to be so great.

Amongst other applications of power may be mentioned conveyors for baskets, bags, and batches of letters; carriers for telegrams; heating and ventilation (involving 600 installations); bag cleaning, telephone exchange power plant, and electric lighting (over 400,000 lamps of 8-c.p. equivalent). The next development will be the Post Office (London) Railway, which will consist of two tracks of 2-ft. gauge in a single tunnel 9 ft. diameter, running from Paddington to Whitechapel *viâ* Clerkenwell. In conclusion, reference must be made to experiments now being conducted with electric trucks and vans for street traffic.

A MODEL ELECTRIC WIRING SPECIFICATION.

THE subject of this title is not actually under review. Indeed, it may be said that "'Tis a consummation devoutly to be wished." Nevertheless, the Notes and Suggestions for drawing up such a specification, received in printed form from Mr. W. R. Rawlings, A.M.Inst.E.E., and obviously intended for the use of architects and builders, go a long way towards that end, and should be found extremely useful on account of their very simplicity. As a matter of fact the title adopted by the author is somewhat modest, because he really provides a specification which can be applied to any one of six systems of electric wiring, viz.:—The Kalkos, steel tube, Stannos and wood-casing systems, and the Kalkos and Stannos earthing systems, all of which were dealt with in a recent article in this journal. The specification is, therefore, somewhat elastic—that is to say, it is so drawn up that, in order to complete it, the clause relating to the particular system selected need only be inserted in the space left for its reception. Everything else is common to all six systems.

We notice that the author considers that wood-casing is generally confined to surface work, where appearance is of no moment. But surely there are hundreds of wiring contractors who, rightly or wrongly, use wood-casing under floors. It is also of importance to note that the Institution of Electrical Engineers' rules are accepted as standard, and therefore that slip-joint tubing is ruled out. We wonder, however, how many contractors are honest enough to "draw in the wires after erection of the tubes."

Under "Circuits" it is stated that where six or more lights are arranged in one apartment two circuits must be employed. Surely it is not necessary to have six lights in a room in order to avoid being plunged into darkness by the blowing of a subcircuit fuse. Under "Joints" it is laid down that the soldered wires are to be insulated with six layers of pure rubber and other protecting compounds. We should like to find a wireman who observes this practice. The suggestion that a chart showing the positions of lights on each circuit should be placed near the fuses is an excellent one, too rarely adopted, and should be enforced. It is stated under "Flush Switches" that it is usual to schedule these in reception-rooms only. Why, then, in the sample schedule of lights is the dining-room pendant honoured with a flush switch, whilst the fireplace and side-board fittings have to be satisfied with surface switches?

Under "Alterations" it would be as well to remember that verbal orders should not be accepted from the client. Everything should be written down and a signature obtained, to avoid subsequent disputes. The clause regarding "Testing" is somewhat ambiguous. It says that the test should not be less than 100 megohms per point, with a note that the Institution of Electrical Engineers' rules require 1 megohm for 30 points, and therefore half a megohm for 60 points. From this it would follow that the test for one point should be 30 megohms. The sample schedule of lights already referred to is a useful guide.

Altogether, the author, who is one of the principals of Messrs. Rawlings Brothers, Ltd., of 82, Gloucester-road, South Kensington, is to be congratulated on his enterprise in drawing up these Notes and Suggestions. It is a pity that other electrical contractors do not sometimes take the initiative in matters of this kind, but are content to plod along under any sort of specification, no matter how unsuitable.

DAYLIGHT ILLUMINATION.

A MEETING of the Illuminating Engineering Society was held on the 16th inst. at the Royal Society of Arts, John-street, Adelphi, when Mr. Percy J. Waldram, F.S.I., read a paper entitled "Some Problems in Daylight Illumination, with Special Reference to School Planning."

In the course of his paper the author said:—

"The illumination of buildings by natural light, as obtained by forming openings in the walls and ceilings of rooms, is an operation which so materially influences the structure and the subsequent utility and value of all buildings, to say nothing of the architectural and other amenities, that one is rather staggered to find that practically no rules exist which determine what width, height, and arrangement of glass area will afford adequate illumination for any given size of room. Still more strange is it to find no recognised criterion in existence as to what is adequate natural illumination for any given purpose, such, for instance, as a school, a library, a dwelling-house, an office, a retail shop, or a workshop.

By means of vertical windows we admit to our rooms a small (an extremely small) proportion of the illumination enjoyed outdoors, but what that proportion should be for any specific purpose has yet to be defined. When we come to consider the matter we find that the daylight source varies from month to month and from hour to hour on normal days by several hundreds per cent., whilst on many days it will vary by 50 per cent. to 100 per cent. in the course of a few minutes.

The extent of the variations in changeable weather is really far greater than is commonly supposed. This fact alone makes the measurement of the ratio of the outside light which is enjoyed by any room a difficult task even with accurate and handy measuring instruments—except on light, grey days, when the sky is of equal and approximately permanent brilliance for considerable periods of time. When, in addition, we consider the idiosyncrasies of the unaided human eye it will be seen that its estimates of natural illumination are liable to vary enormously without the estimator being even aware of his errors. Herein lies the explanation of the curious anomaly that in ancient light cases the most absolutely contradictory evidence may be given in perfect good faith by different experts of equal skill whose integrity is above suspicion and who may be quite capable of fairly appraising the effect of all other matters tending to modify the value of real estate and of tracing such effects amongst the ramifications of underleases and subsidiary interests.

It is simply because experts trust to the impressions received by their unaided eyes, in ignorance of the fact that isolated impressions cannot be taken as even rough criteria of average conditions over long periods, and that the eye as a measuring instrument is so hopelessly inaccurate that to depend upon it for estimating natural illumination can only be compared with an attempt to locate the points of the compass by observing the direction and temperature of the wind.

A thousand foot-candles of daylight or sunlight is less trying to our eyes than ten foot-candles of artificial light. This is possibly due to the fact that we have only been accustomed to the use of the latter for, say, 150 years or so—a period which is extremely minute in comparison with the countless ages through which our eyes have developed under natural light.

The eyes of many people are particularly susceptible to colour, and if the walls of a room be covered with a white paper with a light-pink pattern, the eye, noting their cheerful lightness, will pronounce the room a light one, whether it really be so or not. On the other hand, if the walls be dull grey or brown, as in the Court-rooms of the Royal Courts of Justice, one is obsessed by their sombre gloom, and will find it most difficult to avoid the conclusion that the courts are dull and badly lit, even though by virtue of their high windows or lantern lights they may really enjoy a degree of illumination for reading and writing such as is received by very few ordinary rooms, and may be able to dispense with artificial light on a winter afternoon for a considerably longer period than would be possible in a room lit with windows of the ordinary height.

We must also make ample allowance for the fact that clear blue sky necessarily suggests the idea of unobscured sunlight which gives the most intense degree of illumination which our eyes will stand; whilst on the other hand clouds indicate a material reduction of such light. But these are outdoor conditions, and as we have taken to living and working so much indoors our intuitive impressions are apt to prove deceptive unless we recognise that blue sky gives us very little of that diffused light upon which all interiors must depend when they are not receiving the sun's rays, direct or directly reflected. White or very light grey clouds, in fact, materially increase the illumination of interiors.

The very commonly held supposition that the contrary is the case is often bolstered up by the tests of the length of time required to darken photographic paper, which, however, is unduly sensitive to the rays of light from blue sky. This is unfortunate, because otherwise such photographic tests would have been valuable in many cases, instead of being, as they are, sometimes accurate, sometimes approximate, and sometimes wholly erroneous.

The only accurate practical method we have at present of measuring illumination readily by a single observation is to utilise the ability of the eye to judge the relative brightness of two small similar surfaces receiving low degrees of illumination, one of which slowly varies in

brightness, and to determine the point at which they are equally bright.

This is, of course, merely the science of photometry, which has been brought to a considerable degree of perfection during the last few years with regard to the exact measurement of light sources, of the illumination they produce, and of natural illumination. By its means we may hope to correct the fallacies of impressions conveyed by isolated observations, the idiosyncrasies of the eye and the mind and the errors introduced by the difficulty of allowing for inherited prejudices due to influences which have little or nothing whatever to do with the subject.

The problems of daylight illumination have been studied to some extent, and those which await solution can be defined. An attempt is made herein to marshal them for your consideration, to indicate what has been already done towards their solution, to define certain data which is still required, and to suggest some practical means of obtaining it.

The main problems of daylight illumination may be briefly stated as follows :—

(1) What is the minimum natural illumination at which artificial light becomes preferable ?

(2) What are the conditions of minimum sky brightness under which such minimum inside illumination ought to be obtained, or, in other words, what is the minimum ratio which the inside light should reasonably be expected to bear to the outside ?

(3) What are the relative lighting values under various conditions of a square foot of window-glass situated at different positions in the wall or ceiling of a given room, and with various degrees of obstruction of the total sky hemisphere by surrounding buildings ?

(4) For properly lighting a given point in a room, such as a desk by the wall furthest from the window, what is the minimum angle which the top of the glass should make with the horizontal at that point; or, what height of window head is essential if the back of a room of given depth should be reasonably well-lighted with given degrees of obstruction by surrounding buildings ?

(5) For lighting a given point in a room, what is the minimum horizontal angle of window glass which should be subtended at that point; or what width and distribution of window glass is essential in a room of given width with given degrees of obstruction by surrounding buildings ?

(6) To what extent in each case is the illumination affected by the colour of walls and ceilings ?

Before considering these questions, either in general or in detail, it is necessary to clearly appreciate that a correct solution in one case of daylight illumination will not necessarily be correct in another, on account of different considerations whose relative importance vary in different cases. The best illumination for reading, writing, drawing, and the majority of handicrafts is determined by the physiological fact that our eyes during such operations only take in rays of light which are reflected back from the object viewed, within angles of about 10 deg. or so from the vertical; and we only see an object by means of the light reflected back from it into our eyes, which is not necessarily by any means all the light falling on to it, or even a large proportion of such light. For the purposes named low angle light is of minor importance, whereas for other purposes, such as the illumination of wall diagrams and blackboards in a schoolroom, it may be invaluable. Again, a drawing office, a law court, or an operating theatre in a hospital might receive the most perfect illumination from a large lantern light which would be all but intolerable, say, in the wards of the same hospital. In a schoolroom the high angle light which is essential for reading and writing has a most cheerless and depressing effect when it is the sole source of illumination; and supplementary lighting by window glass at a lower angle, inefficient and uneconomical as it seems as a lighting agent, has a beneficial effect on the minds of scholars which is of no small educational importance. Schoolroom windows which exclude the high angle midsummer sun, whilst admitting what there is of low angle winter sun, must not necessarily be wholly despised by school architects on account of their poor return in desk illumination; and a patient would probably recover more readily in a hospital ward with comparatively low window sills admitting the early morning and late afternoon sun than in one which merely gives an excellent vertical illumination to the doctors and nurses. For some purposes a strong and perfectly diffused illumination must be secured at all costs; for other purposes the same perfection of diffusion would be most undesirable. In the workshop of an optician or scientific instrument maker shadows may be highly objectionable, whilst in a modelling studio a certain depth of intensity of shadow may be quite necessary.

A laundry may be best lit by a strong high angle light accentuated by white walls and ceilings, whilst in a needle room the eye absolutely requires the relief and recuperating effect of soft subdued wall tints, which may possibly discount the illumination to a material extent.

Again, breadth of aspect which might decidedly enhance the rental value of a dwelling-room would probably be only distracting in a court of law.

In every case we must weight the relative importance of factors whose requirements may be different and even contradictory. So that even, when we are in a position to determine what size and arrangement of window glass and what minimum obstruction of sky area gives us the best illumination for a given purpose, we must still beware of pursuing ideals too far; and we must apply the touch-stone of economic and structural common sense as we do in every other building problem. A parabolic lattice girder may be the most economical weight carrier; but it is poor economy to save, say, 15 per cent. of rolled steel joists costing 10s. per cwt. by adopting lattice girders at 20s. per cwt. It is precisely the same with lighting problems. In designing a block of offices an improvement in the lighting which might increase the rental value of the lower floors by a problematical 5 per cent. or 10 per cent. would be dearly purchased by enlarging the interior light wells to an extent equal to 25 per cent. of the cubical contents of building otherwise available. It might appeal to our altruistic ideals of good lighting, but our client in his next building would probably cut down his light wells to an excessive degree. To take another instance, it might be decided that the best lighting conditions for schools could only be obtained in one-story buildings; but to insist on the invariable adoption of that type (probably admirable in country districts) for the enormously expensive sites of crowded towns might so eat up available funds in providing a few excellent new schools that the improvement of old schools, where the children's eyes were suffering daily, would be postponed; or the new buildings might have to be so flattened out that the playground areas would have to be unduly decreased and the building walls pushed so close to surrounding buildings that ventilation would suffer.

Available Rules and Data for Daylight Illumination.

Various attempts have been made from time to time to define the essential conditions of good lighting, but the different rules or approximations advocated seldom agree with each other—they do not allow for varying conditions; and none of them, as far as the writer is aware, define any definite minimum or test illumination. In this country the minimum requirements of the London Building Act—viz., a glass area of one-tenth of the floor area for vertical lights and one-twelfth for skylights—are frequently adopted as maxima, and the now discarded rule for schools of a glass area of one-fifth the floor space for vertical lights is equally respected. As regards permissible obstruction by surrounding buildings, a limiting angle of 45 deg. from an horizontal plane is often regarded, *faute de mieux*, as the criterion of reasonable obstruction.

During last summer Dr. Kerr suggested the use of a view-finder in connection with the inspection of school lighting, and made an instrument which enabled empirical values to be given to each element of the field of vision. These values were those indicated by the well-known cosine law, and could not be readily varied, whilst the picture was an ordinary flat photographic impression. Developing this suggestion, the writer, in co-operation with Mr. Conrad Beck, has recently succeeded in devising a view-finder which shows simultaneously the total visible hemisphere of sky subtended at a window divided into angular degrees and the extent to which such sky is blotted out by buildings. The saving of time which this instrument effects in ancient light cases is enormous. Aspect diagrams giving all the angles and planes can be drawn in a few minutes.

If we knew what relative values to attribute to each different element of sky, and what total value was essential to good lighting for any given purpose, we could tell at once either by observation in the case of existing buildings or by ordinary geometrical projection in the case of new designs whether any window were unduly obstructed. By similar observation or projection from inside a room lit from a sky which had a given net lighting value left to it by surrounding buildings, it should be possible to determine :—

(1) The size and shape of glass area requisite for the worst parts of the room.

(2) What parts of a room were or were not reasonably suitable for any given purpose.

(3) What annual extra expenditure of artificial light would be involved by any given obstruction to maintain a given minimum during working hours.

(4) To what extent (3) could be mitigated by altering the height of window heads or the colour of walls and ceilings.

As will be shown later, it is possible to determine (2) and (3) by direct photometric measurement of the ratio of inside or outside light, and to determine or predetermine (1), (2), (3), and (4) by direct photometric measurements on models, but photometric measurement in actual rooms is only applicable to existing conditions, and is useless for predetermining prospective conditions or for the retrospective comparison of light formerly enjoyed, unless the latter has been recorded; whilst model tests, invaluable as they are in ancient light cases, are too tedious and expensive for many purposes. For the inspection of existing schools and workshops, for instance, an inspector would require to place on the window sill some instrument which will show or compute the lighting value of the available sky, then place it on each desk or bench, and be able to state or record definitely without delay which desks were sufficiently well lit and which desks, if any, must be condemned; and, with regard to the latter, whether their defects could be remedied by altering the windows or whether they were hopelessly irremediable on account of deficient sky area. Obviously, before this can be done, we require to know the relative values for lighting purposes of different elements of the sky. In this connection it is assumed that loss of light due to dark walls and ceilings or unsuitable glass are superficial matters which could be rectified at nominal cost.

In the Appendix is given a summary of the conclusions arrived at by different continental authorities, for the compilation of which our thanks are due to Dr. Kerr. Whilst feeling the greatest admiration for the work of these talented and painstaking investigators one cannot help a feeling of regret that they should apparently at least have failed in many cases to co-ordinate their findings with any definite standard, and in others to appreciate that the good or bad lighting of a room depends simultaneously upon at least three conditions and not upon any one of them. These are :—

(*a*) The extent or lighting value of the outside sky.

(*b*) The height of window head.

(*c*) The breadth and distribution of glass.

As a basic proposition it may be stated that a certain height of window head is essential to the proper lighting of a given depth of a room, whilst a certain width and distribution of glass is similarly essential to the proper lighting of a given width of room, and that both depend upon the lighting value of the unobstructed sky enjoyed by the window, vertically and laterally. The fallacies of the rough rule making the glass area a certain proportion of the floor area are now generally recognised.

The most important point with regard to existing recommendations is the frequently recurring suggestion that a minimum of sky must be visible from every point of a classroom. Much as one would desire it, this is obviously not essential to good lighting. No one could reasonably assert that English elementary school classrooms, constructed under the rules of the Board of Education, in towns, with an angle of obstruction by surrounding buildings of 30 deg., are improperly lit. Yet in such rooms one can only see the sky at the back of the room by lying down on the floor, and in no class of building with vertical lights is it customary to have such large high windows as in elementary schools. The fact that this devitalises the result of such a large amount

of continental experimental research is regrettable, but facts must be faced.

Some years ago, when endeavouring to co-ordinate indoor illumination with the sky brilliance which generates it, the writer adopted a method first devised by Mr. A. P. Trotter, and constructed an arrangement for reducing to measurable proportions the enormously powerful illumination outdoors, and he measured the ratio borne to it by the light enjoyed in the interiors of many buildings.

In a paper read before this Society in 1911 on the effect of wall and ceiling reflections a couple of simple devices were described which are somewhat useful in the practical study of daylight. One is a means of testing under artificial light the accuracy of any illumination photometer used other than a laboratory. If a standard candle be lit and placed one foot from a card in an ordinary room part of the illumination on the card comes by reflection from the walls and ceilings. This can be measured by screening off the direct light from the flame of the candle with a very small piece of dark card; the illumination then remaining on the card is that due to reflection and diffusion, and when deducted from the first reading leaves the direct light which the card would receive in a proper photometric laboratory with black walls and ceilings.

Similarly the proportion of daylight enjoyed at any part of a room which is reflected from walls and ceilings can be ascertained by measuring the illumination existing in the shadow of a small black card interposed between the window and the point under consideration.

The writer has also carried out some successful tests to establish the reliability of a suggestion which he made some years ago to the effect that the daylight illumination of a room is the same as that which can be viewed inside any exact scale model of that room facing the same sky and the same obstructing buildings.

Data Still Required for the Solution of Problems of Daylight Illumination.

(1) *Minimum Illumination.*—Photometric data is needed to determine the value in foot-candles of minimum natural illumination required by average persons. It naturally varies for different purposes.

(2) *Minimum Ratio of Inside to Outside Illumination.*—Some years ago the writer suggested that owing to the large and often rapid fluctuations of daylight the only exact photometric standard one could take was the ratio of the brightness of the zenith sky to the inside light; and that the only standard without instruments was the inside illumination enjoyed at sunrise and sunset on clear winter days, at which times the zenith sky is of at least approximately similar brilliance. This is really a very low criterion, the brightness of zenith blue sky being then only about 100 foot-candles in round figures. It is seldom darker than this between sunrise and sunset, and is generally much brighter even on wet days in winter in towns. Between sunset and sunrise, or when the sky is, in abnormal weather, darker than 100 foot-candles, it would appear to be unreasonable to expect any room to be lit by daylight. It must be noted that the light at sunrise or sunset with a clear sky is increasing or decreasing rapidly. It would not be correct to make such a test at, say, Plymouth without allowing for the fact that the sun there rises or sets sixteen minutes later than the calendar time owing to 4 deg. of west longitude. Any test should, of course, be made at sunrise in rooms facing west and at sunset in rooms facing east.

For offices and domestic apartments the following ratios were suggested, viz.:—That the requirements of ordinary comfort cannot be said to be intringed at any point where it was possible to read at sunrise and sunset on a clear winter day. This is equivalent to a ratio of 0·1 per cent. (1-1000) of the light derived from a small portion of the zenith sky, 0·2 per cent. of the total light from an unrestricted full hemisphre of sky of the same brightness, such as would be observed on a white card placed on a roof under a uniformly grey sky, and 0·4 per cent. of the illumination falling on a white card on the window sill with a free horizon.

For schools it would appear that the desirable minimum is somewhat in the neighbourhood of two and a half times as much as in offices—viz., that the darkest desk should receive 2½ thousandths (0·25 per cent.) of the zenith light, 0·5 per cent. of the roof light, or 1 per cent. of the light on the window sill with a free horizon.

This is equivalent to saying that at sunrise or sunset in a clear winter sky, or at other times when the sky has an apparent brightness of, roughly, 100 foot-candles, the worst part of an office should receive a minimum of one-tenth of a foot-candle and the worst desk in a school one-fourth of a foot-candle.

Dr. Bishop Harman has suggested nine foot-candles as a minimum daylight illumination. But this is probably for young children occupying dark places in a schoolroom with very light walls. In ordinary rooms most people can read fine print under a daylight illumination as low as one-tenth of a foot-candle.

(3) *Relative Lighting Value of Different Elements of Sky.*—The writer suggests that this important and even fundamental data can be most easily obtained by placing a large spherical wire cage outside the window of different model rooms and ascertaining the effect upon any given part ot the interior produced by blocking out alternate angular divisions of sky. Possibly the relative values thus found might be identical for all ordinary conditions, possibly certain elements might be more valuable in some cases than in others; but even in the unlikely event of a number of different sets of ratios being found to be necessary for different conditions of window height and width to depth and width of room they could easily be printed in the different angular squares of similar diagrams on tracing-paper, the appropriate tracing selected, and the true value of the actual sky lost and retained in any case could be at once computed.

Only when we really know the different lighting values of different elements of sky can we determine what degree of obstruction will affect any user of given premises. The determination of this obviously affects huge sums, not only of private expenditure, but also of public funds, as in the case of schools, where it is often necessary to determine whether old buildings shall continue, whether they can be improved or must be rebuilt on a new site, and whether they may be extended on the same site to cope with the needs of growing districts.

Relative Values of Window Space in Different Positions.

The collation of sufficient data to determine this problem from actual rooms would be a stupendous task, and it is indeed fortunate that the daylight conditions of rooms are exactly repeated in scale models in which the effect of different arrangement of window space, wall surfaces, and sky obstruction can be studied at a minimum expense. It is also more than probable that an artificial sky could be reproduced by a hemisphere of cotton-wool on a wire framework which would give the same photometric readings under artificial light as a uniformly grey sky; and thus materially reduce the extent of experimental labour, which might otherwise be so tedious that comprehensive results would be almost prohibitive.

The data at present available gives uniform indications that for table or desk illumination a vertical window can only be safely called upon to light a depth of room equal to twice the height of the top of the glass from the table or desk height—viz., the space lying below a plane which forms an angle of 26½ deg. with the horizontal from the top of the glass. This, of course, is only in accordance with the ordinary proportions of well-designed rooms.

Taking the table height at 3 ft., such a rule would work out as follows:—

Height of Top of Glass above Floor.	Width of Room Lighted.
Feet.	Feet.
9	12
10	14
11	16
12	18

For schools an angle of 30 deg. would appear to be preferable.

For windows with northern aspects it also appears that within these horizontal limits of the reasonable range of a window sky obstruction generally makes very little difference, if any, up to about 60 deg. with the horizontal, measured upwards from the sill; but in portions of a room beyond the proper range of a window the light drops so rapidly that they are sensibly dark by comparison, and actually so in dull weather even with a free horizon.

Exact data on this point can be obtained both from experiments on models and by noting the effect of lowering dark blinds in any rooms.

With regard to the proper width of window for a given width of room, and the relative value of lateral sky for lateral lighting, the writer has as yet made but few observations.

The Value of Light Reflected from Walls and Ceilings.

With regard to this important point, the amount of experimental data available is also very meagre. Tests of the daylight illuminations on a card placed at different parts of rooms first when unobstructed and then when shaded with a small card which just blocks out direct light from the window glass and leaves only the reflected light tend to show, as would be expected, that at and beyond the "effective range" of a window light reflected from the walls and ceilings, especially the latter, is a much larger proportion of the total light available than it is in positions nearer to the window, although it is naturally greater there. The writer has not, however, had time to make sufficiently numerous tests on model rooms papered in different colours to be able to give any definite opinion as to the necessary co-efficient of reflection in walls and ceiling paper which is essential to keeping any part of a given room up to a given standard.

Additional Artificial Light Involved by Lowering the Daylight Illumination of Rooms below a Given Standard.

When we are in possession of large scale time charts, showing the average daily variation of daylight, it is a comparatively simple operation to state the average daily number of minutes over which artificial light is required to maintain any given minimum daylight illumination at any point in a room, provided we know or can measure the proportion of the outside light enjoyed by that point. For example, if a worker at a table requires artificial light when the natural illumination falls below one foot-candle and the table receives one-thousandth of the outside light, then a diminution of 10 per cent., whether it be caused by dark walls or ceilings, dirty glass, obscured window heads, or the raising of surrounding buildings, involves extra consumption of artificial light every morning and evening during the average time which the outside light takes to vary from 1,000 to 1,111 foot-candles. If this average works out to twelve minutes over the year, then the total average loss at sunrise and sunset is:—

$$\frac{24 \times 365}{60} = 146 \text{ hours per annum.}$$

The actual loss for most purposes is, of course, very seldom experienced at more than 300 sunsets per year, or sixty hours per annum, and is frequently less than that. Taking the area lit by an average window as equivalent to that lit by a fifty-watt lamp, then only three units of electricity would be involved. It is obvious that any such computation must generally work out at a very insignificant annual sum, and the plaintiff in an ancient light case would seldom be content to value in such terms the loss to his amenities. On the other hand, he generally anticipates that any prospective loss is going to be much greater and more material than it really is.

School Lighting.

The general treatment of this wide subject has left but little space in which to deal with the special branch of school lighting, upon which an eminent architect only a few years ago stated that nothing remained to be said. Yet a Committee of this Society, who, as I have painful reason to know, are extremely enthusiastic and energetic, after having been at work for nearly a year, are still compelled to devote most of their time to the devising of labour-saving systems by which to reduce the great mass of work which still lies ahead of them. Many of their problems have already been indicated, but in addition they have to solve questions relating to unlateral and bilateral lighting, the effect of borrowed lights, the maximum variations between the lighting of various desks, the cure of badly-lit existing schools, and the effect of the standing regulations

of the Board of Education. Let it be said at once that the latter are in many ways most excellent, and the lighting which they secure in new schools is often all that could be desired. But they do not recognise, however, in their sweeping denunciation of skylights, that in spite of the danger of leaking, these are of enormous lighting value, and can, and do, form a most valuable means of curing at slight expense defects in lighting quite sufficiently atrocious to demand the closing of a school. The regulations also do not differentiate between skylights and lanterns or high dormers; and the emphatic denunciation of front lights is also, to say the least, open to question—at least, in cases where the sill is fairly high and the aspect is not sunny. Most of us work facing a window when we can do so.

To adequately treat these questions would probably keep you here till midnight, but the views of school architects would, I am sure, be most welcome to the Committee."

THE CONCRETE INSTITUTE.

A PAPER by Mr. W. Laurence Gadd, F.I.C., entitled "Some Fallacies in Cement Testing," was read at the forty-first ordinary general meeting of the Concrete Institute on December 11, Mr. E. P. Wells, J.P., President of the Concrete Institute, in the chair.

In the course of his paper Mr. Gadd said :—

"In these days the testing of cement is no longer exclusively in the hands of the expert, but almost every user of cement in any quantity now carries out his own tests on the material he buys, or has such tests made for him by his own staff. In some instances this has meant that the cement is judged on results obtained by very inexperienced persons. It may be an excellent thing from the users' point of view to test his own supplies, but there is a danger that the practice may lead to numerous unfounded complaints and disputes as to the quality of those supplies. I do not think it is sufficiently realised that cement testing is a highly specialised skilled work, requiring a more extended knowledge of the properties and characteristics of the material than can be obtained from the instructions given in a booklet or even from a specification. My object in this paper, however, is not so much to question the accuracy of the testing performed by inexperienced operators as to draw attention to what are, in my opinion, fallacies underlying some of the recognised or suggested processes of testing Portland cement; and at the outset I find myself at variance with the British standard specification itself. The standard specification stipulates that before any sample of cement is submitted to certain tests it "shall be spread out for a depth of 3 in. for twenty-four hours in a temperature of from 58 to 64 deg. Fahr."

The object of this procedure appears to be twofold—*i.e.* (*a*) to cool the cement to the normal temperature of the atmosphere, and (*b*) to obtain conditions similar to those governing cement which has lain in sacks or casks for two or three weeks—*i.e.*, during the possible period between shipment and use.

As regards (*a*), this can be very simply done without exposing the sample to air. As regards (*b*), I have made the following experiments :—

Effect on Setting Time of Storage in Sacks.

Two large samples of cement—one freshly ground and the other ground about a month previously—were filled into sacks, tied up, and put aside in the warehouse at each of six different factories on the Thames and Medway and in the Isle of Wight. Samples A, B, C, D, E, and F were rotary kiln cements; samples G, H, J, K, L, M were chamber kiln cements.

Specimens of all these were despatched to me at the time of filling the sacks. After two weeks the contents of the sacks were thoroughly mixed and a second set of samples again sent to me, the remainder of the cements being returned to the sacks and stored for a further two weeks, when the same procedure was again gone through.

The three sets of samples were tested for setting time, with the result that in the majority of cases the cements became quicker initial setting after storage in sacks for fourteen and twenty-eight days; but there are exceptions, as, for instance, in the cases of samples E and F, where one slowed and afterwards quickened, whereas the other first quickened and afterwards slowed.

The final set was in some cases slowed and in others quickened, and it is impossible to generalise on the results. The only thing one can say is that cement kept in sacks, under ordinary conditions of dry storage, may either become slower or quicker setting, but the result cannot be foretold.

Effect of Aerating in Layers 3 in. Deep.

Samples of the cements as received from the works were laid out for twenty-four hours, in accordance with the British standard specification, and then tested, as received, after twenty-four hours' aeration and after seven days' aeration.

The results of these tests show that there is no relation between the effects of aerating cement for twenty-four hours and storing in sacks for two weeks or a month; further, that the setting time is differently affected when the same cement is aerated or stored in bulk in different localities or at different periods. In some cases the effect of twenty-four hours' aeration is the opposite to that produced by storage; and storage or aeration at one period has an opposite effect to storage or aeration at another period.

This appears to me to effectively dispose of the somewhat prevalent idea that changes in setting time are due to some inherent property of different cements. The erratic behaviour found is common to all the samples tested, the composition of which varied within considerable limits, the lime contents, for instance, ranging from 64 to 59 per cent.

The retardation or acceleration of setting time on storage or aeration cannot therefore be due to peculiarities in the cements themselves, but must be due to chemical changes brought about by the absorption of some constituent present in the atmosphere.

Cement has a strong affinity for moisture in the first place, and for carbonic anhydride in the second place, and these constituents are present in the atmosphere in variable proportions at different times and in different localities.

From former experiments and reasoning I have held the opinion that absorption of moisture results in a retardation of setting time; whilst absorption of carbonic anhydride produces an accelerating effect. Cement exposed to both influences will therefore have its setting characteristics affected one way or the other according to the relative amounts of moisture and carbonic anhydride absorbed, the net effect being the resultant of the two opposing forces.

The author then detailed a number of laboratory tests confirming his theory, but only put forward his incomplete work as clearly indicating that to artificially aerate cement in the laboratory before testing its setting time is a misleading operation.

Fineness.

When sifting cement through a sieve to obtain the proportion of particles too large to pass through the interstices between the wires the size or area of the individual holes appears to be the only condition of importance; and it is to be assumed that the intention of the framers of the standard specification was to ensure this condition being standard.

I have, however, examined many rolls of cloth which contained the stipulated number of threads, of practically the correct diameter, and yet were hopelessly inaccurate for the purpose of testing cement for fineness.

I submit that the size or area of the holes in a sieve is the real standard, and should be stipulated, the actual diameter of the threads, or their precise number per inch, being of secondary importance.

I have therefore formulated a specification for my own use which aims at a standard sieve, whilst at the same time recognising and allowing for the great difficulty of weaving cloth of this nature with extreme accuracy.

This specification for 180 sieves I state as follows :—

1. The standard area of the holes in inches is $\cdot00355^2$.

2. The equivalent mesh, calculated from the actual average area of the holes, as measured, shall fall between 176^2 and 185^2.

3. The mean variation from the standard width of holes shall not exceed 10 per cent.

4. Not more than 10 per cent. of the holes measured shall exceed a variation of 15 per cent. from standard.

It is my practice to measure with a micrometer microscope about 300 to 400 spaces in several different parts of a roll of cloth; and I find it is possible to obtain cloth to conform to the foregoing specification, and that such cloth gives in use very fairly consistent results, whereas sieves which conform to the British specification—as worded—often give, in testing, most erratic results; in one case the difference between two sieves, both of which contained the correct number of wires per inch, amounting to 20 per cent. of the total residue.

Another point which appears to be overlooked is the size of the sieve itself. The British specification stipulates that 100 grm. of cement shall be sifted for a period of fifteen minutes, but does not specify the total area of the sieve to be used. I have seen in use sieves varying in size from 4 in. diameter to 9 in. or 10 in. square; and it is obvious that the same weight of cement, sifted for the same period of time, will be more effectively sifted over a larger area than over a smaller one.

Specific Gravity.

The specific gravity test is now used in place of the old method of taking the weight per striked bushel, which has for some time been discredited, and rightly so.

The weight per bushel had no real bearing upon or relationship to the degree of calcination, but was chiefly influenced by the fineness of grinding. The fallacious character of this test was well known to cement experts long before its abolition from so-called up-to-date specifications, in some of which it appears, even to-day, as the "weight per litre test."

The specific gravity of carbonic anhydride and of water being ·88 and 1·00 respectively, it will be readily seen that comparatively small proportions of these substances, absorbed from the atmosphere, are sufficient to reduce the gravity of cement to a material extent.

Butler has shown that if the absorbed water and carbonic anhydride be expelled by igniting the cement the specific gravities of cements of various makes become so nearly identical as to afford no indication of quality.

The conclusions reached by Butler were :—(1) That the specific gravity of cement is no indication whatever of proper calcination. (2) That the specific gravity depends upon the age of the cement and the opportunities it has had of absorbing water and carbonic anhydride from the air.

These conclusions are quite in accord with the experience and the opinion held by myself for some time past.

My own experience is that when taken freshly from the kiln the specific gravity is practically the same whether the clinker be well burned or under burned, provided the carbonic anhydride has been all, or nearly all, expelled from the chalk. This is in accord with some results published by Redgrave, who found the specific gravities of four samples, taken from one place in the kiln, to be as follows :—

	Specific gravity.
1. Yellow, slack burned clinker ...	3·16
2. Good clinker	3·17
3. Very lightly burned, showing spots of lime	3·20
4. Over-burned vitreous clinker ...	3·19

It will be noticed that the highest of these gravities is that of very under-burned clinker, which confirms Meyer's statement.

The specific gravity of cement being merely a measure of the degree of aeration which the sample has received, and the finer particles being naturally more absorbent of water and carbonic anhydride than the coarser pieces, it follows that a finely-ground cement, containing much flour, will more rapidly have its original specific gravity reduced by aeration than will a coarsely ground sample, and would thus, falsely, appear to be the more lightly burned of the two.

In some specifications the specific gravity is directed to be taken after the cement has been dried at 100 deg. C., but this proceeding can have no effect, as the water absorbed exists in the combined state, and the temperature stated would not expel any portion of it, nor would any carbonic anhydride be driven off; the lowest temperature for the expulsion of this gas being 300 deg. C."

Standard Sand.

After giving details of the varying qualities of sand stipulated for in various foreign specifications, and the resultant modifications of strength attending their use, the author continued :—

"There is a somewhat general idea that tensile or crushing tests of cement with standard sand represent the best results of which the cement is capable. This is erroneous. Sand tests do not give the highest results which can be got out of the cement, but give results which are

standardised, and therefore comparable with those obtained by different operators. The crushing strength, especially of concrete or mortar, depends largely upon the size and character of the aggregate, the absence or presence of dust, clay matter, and other things, and the density of the mass. The use of standard sand merely gives results which are comparable, and only represent the strength of a cement when tested under certain conditions and with an aggregate of a definite size and character.

Bearing on this point, the following table gives the results of crushing tests on 6-in. cubes. The same sample of cement was used in all the tests, and the mortar was gauged to a plastic consistency and shovelled into the moulds without tamping. The results are expressed in tons per square foot:—

THREE-MONTHS-OLD CUBES OF CEMENT CONCRETE. CRUSHING STRENGTH TONS PER SQUARE FOOT.

4 : 1.		6 : 1.		8 : 1.	
Pit Sand (coarse)	82	Standard Sand	62	Pit Sand (fine)	36
Pit Sand (fine)	95	Pit Sand (fine)	63	Standard Sand	43
Standard Sand	111	Pit Sand (coarse)	67	Breeze	47
Breeze	133	Breeze	81	Burnt Gault Clay	50
Burnt Gault	144	Burnt Gault	107	Pit Sand (coarse)	51
Thames Ballast	176	Crushed Flints	114	Crushed Flints	76
Granite Chips	180	Granite Chips	122	Granite Chips	88
Crushed Flints	194	Ragstone Chips	125	Ragstone Chips	89
Ragstone Chips	220	Thames Ballast	138	Thames Ballast	125

From these results it will be seen that the crushing resistance of concrete made from the same cement varies not only with the size, but also with the character of the aggregate. The whole of the specimens were kept in damp air only until due for crushing.

Autoclave Test.

This test, recently proposed by Mr. H. T. Force, in charge of testing materials on the Delaware, Lackawanna, and Western Railroad, of Scranton, Pa., is merely a revival of Dr. Erdmeyer's high-pressure steam test introduced in Germany about 1881, and rejected by German cement experts as being unreliable and misleading. In the words of Professor Gary, of the Royal Bureau of material testing, it is even less adapted to distinguish useless cements from useful cements than the usual methods of determining constancy of volume.

I hold that growth of strength by age is of less importance, and is not such a criterion of quality as is generally considered. Modern cements prepared from purer clinker and much more finely ground than formerly attain a strength approximating to the maximum much more quickly, and it is evident that a cement which attains, say, ·8 of its maximum strength at short dates has less margin for growth than one which only develops ·5 of the maximum in the same time.

There is therfore nothing to be gained by carrying out the test at the high pressure advocated in America.

With regard to the utility of such a test, it must first be shown that cements which pass the simpler soundness tests generally employed in this country will yet be dangerous in ordinary work; and, secondly, that the autoclave test will detect such cements with certainty. So far neither of these points has been demonstrated. In fact, the original paper read by Mr. Force before the American Society of Testing Materials on June 25 last contains internal evidence that the results obtained by the autoclave test have no relation to the ultimate strength of a structure, inasmuch as some of the cements which failed under the test showed under normal conditions a higher strength at six months than those which successfully passed the ordeal of the autoclave.

Quite recently the autoclave test has been objected to critical examination, both in the United States and in Canada; and the conclusions arrived at are that a case for its adoption has not been made out, with which conclusion I agree.

Free Lime.

No theory connected with Portland cement has obtained a stronger hold, or has attained such hoary antiquity, as the idea that unsoundness of cement is due to free lime locked up within the particles of the ground material. In fact, this theory has been for so long accepted that to question it may possibly be met with derision.

Nevertheless, I confess I have never been a believer in this bugbear, the existence of which has never been demonstrated, although many abortive attempts to do so have been made. Certainly free lime, in the sense in which it has generally been understood, cannot produce the blowing or disruption which occurs with unsound cement, because an addition of free lime, in the form of ignited calcium oxide, has the effect of reducing expansion by inducing the hydration of particles of hard clinker grit, in the same way that ammonia or ammonium carbonate does so.

The improvement in soundness, brought about by the exposure of cement to a damp atmosphere, lends some apparent support to the contention that free lime is thereby slaked and rendered harmless; but it is rather difficult to understand how the small amount of moisture absorbed from the air penetrates the particles and slakes the free lime when the enormously greater quantity of water used in gauging the cement fails to touch it. Furthermore, unsound cement stored for some time in airtight receptacles, in which presumably no slaking of free lime can occur, becomes perfectly sound.

Exposure of cement to air for a few days sometimes results in an increase in the amount of expansion, as tested by the Le Chatelier method, and this increase is nearly always proportionate to the amount of aeration undergone, *i.e.*, the thinner the layer in which the cement is laid out the greater the increase of expansion.

This phenomenon was pointed out by me in an article published in 1907, and was the subject of a paper presented to this Institute by Mr. Butler in 1910. The facts are therefore well authenticated, and they are directly opposed to the theory that expansion of cement is caused by free lime.

We know very little yet of the properties of lime in a state of solid solution. It is stated to be crystalline and to hydrate slowly; but if the solid solution theory be correct, crystalline free lime is present in considerable quantity in all Portland cements, whether sound or unsound, and it has not been satisfactorily explained why the lime hydrates without expansion in one cement but does so with destructive force in another.

It is also well known that a low-limed cement is often more unsound than a high-limed cement which again is antagonistic to the free lime theory.

My own view is that unsoundness in cement is probably due to the presence of an abnormal silicate, perhaps dicalcium silicate, which is an unstable compound and slowly disintegrates with an increase in volume. The phenomenon of "creeping clinker," known to cement makers, is an illustration of the disintegration, with increased volume, of dicalcium silicate, which is formed when clinker contains an insufficiency of lime; and this or a similar compound is most likely to be found in unskilfully-made cement in which the proportions of lime, silica, and alumina are not present in correct combining weights, or when the temperature of burning is insufficiently high to induce the formation of those silicates and aluminates which constitute true Portland cement."

The reading of the paper was succeeded by a discussion, in which the following took part:—

Messrs. D. B. Butler, A.M.Inst.C.E., F.C.S., Member of Council C.I.; W. G. Kirkaldy, A.M.Inst.C.E., Member of Council C.I.; A. O. Trechman, F.C.S., M.C.I.; Percival M. Fraser, A.R.I.B.A., M.C.I.; W. G. Perkins, District Surveyor for Holborn, Member of Council C.I.; W. A. Green, M.A., B.Sc.Eng. (St. Andrews), A.M.Inst.C.E., M.C.I.; J. N. N. Shillito, M.C.I.; W. H. Shortt, A.M.Inst.C.E., M.C.I.; H. J. Harding, M.C.I.; W. F. Gibson; W. Laurence Gadd, F.I.C., M.C.I.; E. P. Wells, J.P., President of the Concrete Institute.

The following were elected members of the Institute:—

Messrs. Ernest Hirsch, London; Mr. Horace Mersham Lewis, M.R.San.I., A.M.M. and C.E., Westminster.

The following were elected Associate members of the Institute:—

Messrs. Peter Baillie, London; Alexander Cruickshank, M.Aber.A.A., M.Educational Inst. (Scot.), Aberdeen; Shirley Onslow Limby, S.Inst.Min. and Met., Westminster; Walter Charles Oram, Executive Engineer (Divisional), India; Clifford Woolcott Nash, Melbourne, Australia; Thomas Walker Pearce, Melbourne, Australia; Lewis Wynne Wynne-Roberts, B.Sc., Eng. (Lond.), Regina, Canada; Frederick James Willson, B.A. (Cantab.), S.Inst.C.E., Junior H.Can.Soc.C.E., Engineer, India; Thomas Forkes Young, S.Inst.C.E., Dublin.

The following were elected Associates of the Institute:—

Messrs. George Coe, Westminster; Joseph Dalton Gregory, M.R.San.I., Manchester; Paul von Lechler, Stuttgart; Hugh Montgomery, Bulawayo.

It was announced that the Council had admitted the following as students of the Institute:—

Messrs. William Walter Begley, Probationer R.I.B.A., London; Edmund Rowno Cardell, B.Sc. (Lond.), Eng., New Cross; Charles William Glover, A.F. Permanent Way Institution, Bolivia, South America.

The next meeting of the Institute will take place on Thursday, January 8, 1914, when Mr. Percival H. Fraser, A.R.I.B.A., will read a paper entitled "Factory Construction."

NOTE.

National Illumination Committee. A Provisional Committee, formed of representatives of the Illuminating Engineering Society, the Institution of Electrical Engineers, the Institution of Gas Engineers, and the National Physical Laboratory, held a meeting last month at which arrangements were made for the formation of a National Illumination Committee, to be constituted according to the statutes of the International Illumination Commission, with the primary object of affiliating Great Britain to that Commission. The Provisional Committee recommended that the National Committee should consist of five representatives of each of the three technical societies and two representatives of the National Physical Laboratory. This recommendation has been adopted, and the following have been nominated as members of the Committee:—By the Illuminating Engineering Society—Messrs. Leon Gaster, F. W. Goodenough, Professor Silvanus P. Thompson, and Mr. A. P. Trotter (this Society has not yet nominated its fifth representative); by the Institution of Electrical Engineers—Messrs. F. Bailey, W. Duddell, K. Edgcumbe, Haydn Harrison, and Professor J. T. Morris; by the Institution of Gas Engineers—Messrs. E. Allen, J. Bond, W. J. A. Butterfield, Dr. H. G. Colman, and Mr. H. Watson; and by the National Physical Laboratory—Dr. R. T. Glazebrook and Mr. C. C. Paterson. The first meeting of this National Committee took place on the 2nd inst., when the following were chosen as officers:—Chairman, Mr. E. Allen, of Liverpool; Vice-Chairmen, Messrs. W. Duddell and A. P. Trotter, both of London; and Hon. Secretary and Treasurer, Mr. W. J. A. Butterfield, of London. Great Britain is entitled to two delegates on the Executive Committee of the International Illumination Commission, and Dr. H. G. Colman and Mr. W. Duddell were accordingly appointed by the Committee as the delegates from this country.—*Times.*

CRYSTAL PALACE ENGINEERING SOCIETY.

The "Wilson Premier" for the best paper read before the Crystal Palace Engineering Society (affiliated to the Society of Engineers Incorporated) during the present session has been awarded by the Council to Mr. R. H. Cunningham for his paper on "Irrigation in India." Other papers read during the session were, "Building Construction in Egypt," by Mr. B. Tarabulsy; "Sewage," by Mr. S. Sa'eed; "Permanent Way in India," by Mr. G. Cummaskey; and "Minerals," by Mr. H. J. English. The "Premium" was presented to Mr. Cunningham by Alderman and Colonel Sir David Burnett, Bt., ex-Lord Mayor of London, on the occasion of the 123rd distribution of certificates of the above School on December 19, at which he presided.

THE BUILDING TRADE.

THOUGHTS ABOUT COST KEEPING.—V.

THE proper recording of the issue and return of scaffolding, and the proper provision for its upkeep and for ascertaining the oncost charges for its use on the various jobs, is often a weak spot in the cost-keeping system of a builder's business. Its neglect, however, may lead to considerable leakage of money through the frequent renewals necessitated by the careless treatment to which it is subjected and to the misappropriations of unscrupulous persons.

In some branches of the trade the recording of scaffolding is unavoidably complicated by the numerous utensils which have to be issued and returned at the same time; for example, in connection with the painting branch, besides trestles, steps, ladders, planks, poles, and ropes, there are paint-cans, buckets, size-cans, brushes, tools, colour-boxes, tubs, oil and varnish tins, covering-cloths, etc., and in the more constructional part of the trade—excavator, bricklayer, mason, etc.—poles, ladders, putlogs, planks, ropes, pitch, kettles, buckets, barrows, etc., and sometimes there will be also machines sent for mortar-making, stone-breaking, and concrete-mixing. What the builder wants his costing system to show him about scaffolding and plant is:—

What has gone out, what has come back, and whether any deficit in the returns is satisfactorily accounted for and charged up to the job where it occurred. He also wants to know how much a year his scaffolding and other plant costs him to maintain in repair and to keep renewed.

As regards recording the issue and return of scaffolding and plant, the writer has found that a card of an oblong shape, having printed upon it, in series down one side, a complete list of the scaffolding, utensils, etc., used for any branch trade, and having the adjoining space to the right ruled into squares, and a total column left on the right hand, has served its purpose satisfactorily. The practice was for the manager to look over the card and indicate by figures in the squares what scaffolding, etc., was to go out to each job; the card was then sent into the storekeeper, who was thus authorised and prepared to issue what was required. The card went out to the job foreman with the plant issued, and came back when it was returned, and the accuracy of the return was then verified by the storekeeper and deficiencies reported. Some charge up to the job all scaffolding sent out, and credit the job with all that is returned. Unless a card of the kind described is used this latter method entails a good deal of unnecessary writing, which could be saved by having the card so ruled as to admit of the pricing of the scaffolding, etc., being done upon the face of it, though it would suffice to merely price out the deficiencies when the plant came back.

As regards maintenance and repair of scaffolding, this should be debited to an impersonal account, and at stocktaking a result will be brought out showing how much the cost has been since the previous stocktaking.

If a comparison is then made with the total cost for labour and materials, as yielded by the impersonal accounts for the same period, a percentage representing the oncost for upkeep and renewals of scaffolding can be inferred, and will be accurate enough for practical purposes so long as no great change in the character of the business occurs to destroy the comparison by changes in its essential basis. It will be found that the percentage for use of scaffolding plant and utensils is much smaller for the more constructional part of the trade than for a finishing trade like painting and decorating, because of the relatively smaller value of the turnover of the latter.

A builder in any considerable way of business, especially if it extends to country districts, requires a horse and trap or a motor-car to enable him to get about his jobs, and the question of charging the cost of it then arises. It is quite simple to arrive at an oncost charge on the principles already described, but it is not the best way of dealing with this expense, because no account is taken of the services rendered to the particular jobs, and there is, therefore, a tendency to abuse the convenience of having the vehicle, especially if not employed at the moment, to make journeys which might have been prevented by a little forethought, and which would not be undertaken if a direct charge against the job concerned was to result. The driver should be required to record on suitable time cards the journeys and mileage made for each job visited, and a charge should be made at a fixed rate per mile against each job. A total record of mileage should be kept, and when the impersonal account for vehicle maintenance, depreciation, and running is ascertained for the year, the mileage rate can be checked and, if need be, adjusted.

In connection with the running of a joiner's shop of any size there is the charging for use of power and machines. The time sheet of the machinist gives the number of hours to charge for each machine, but that does not settle the relative cost of power used in running different kinds of machines and different sizes of timber; neither does it settle what allowance should be made for depreciation and upkeep of machinery.

Where the whole of the machinery is run by steam power from a central source, it is possible to record the total hours of running for a period and get at the cost for the same period; but the distribution of that cost to machines of varying capacities, say, a four-sider and a spindle machine, can only be ascertained either by experiments of a tedious kind or be based upon calculations supplied by the makers. As a matter of fact, the writer believes, they are mostly based upon guesswork.

The extent to which electrical driving has been adopted for wood-working machinery has, however, introduced the possibility of easily ascertaining the power cost per hour of any and every machine with any and every class of work. All that is necessary is to watch for opportunities when single machines are running on certain classes of work, and take readings from the electric meter, from which can be calculated its money cost per hour.

Depreciation of machinery is pretty well established on the basis of deducting 5 per cent. per annum from its capital value. Repairs for a year will appear from the impersonal account for machinery.

There should, therefore, be no difficulty in ascertaining, with reasonable accuracy, the proper charge per hour for use of machines where electric driving is in use.

The other impersonal accounts, from which oncost charges have to be inferred and charged, relate to standing charges, such as rent, rates, and taxes, lighting and heating, discounts, interest charges, staff wages, and the like; they do not call for individual treatment in these remarks, but a word or two about discounts and staff wages may not be out of place.

There is, perhaps, no better index of the way in which a builder's business is managed than the kind and extent of the balance shown by the impersonal account, which sets in opposition the discounts allowed to debtors and the discounts received from creditors on the business transacted from year to year.

From that account can be inferred whether an adequate amount of capital is advantageously employed in the business, whether buying is done on a cash or credit basis, whether selling is mainly on cash or credit terms. If the capital employed and the turnover are known the discounts account will suggest reflections as to whether the capital is employed to the best advantage, is it used for cash purchases, or is it allowed to remain idle in the shape of unduly extended credit to clients, or is there mismanagement of jobs and disputes arising, which is locking up capital until they are settled.

A comparison of the total turnover and the capital invested in the business will suggest questions as to whether an undue proportion of capital is immobilised in stocks and jobs and retention moneys, compared with the amount of mobile capital available to work the business. The state of the discounts account will assist in supplying an answer.

The total business done shows how often the capital is turned over in the year, and the discounts account indicates with what result, so far as buying on the best discount terms is concerned

This side of the business is very closely scrutinised in certain trades—*e.g.*, the cotton trade. A manufacturer there can do business on short terms or long terms, and the difference in the discount is 1 per cent. in favour of the short terms. As some manufacturers turn their capital over ten to eleven times a year, they make it earn 10 to 11 per cent. more by simply paying short terms instead of long. Hence they are most punctilious in doing this; it pays them to be so; the merchant to whom the manufacturer sells is equally keen to get his short term discounts and equally punctilious in paying on time.

How different is the custom in the building trade, where the money for interim payments on jobs has to be almost dragged out of architects and clients, and is generally short in amount as well, where long delays occur in getting final settlements, and large sums of retention money lie useless to the builder, although honestly earned long since! Yet the builder turns his capital over about four times a year, and cash discounts are 2½ per cent., so that he, too, could earn a profit on his capital by paying cash terms even though his work were carried out at cost price. Both the builder and the manufacturer sell on a contract basis, but in the former case all contracts are net, in the latter they are subject to discount for short term payments; perhaps the difference in the matter of discount accounts for the difference in practice, and if builders offered their contracts subject to a cash discount for quick payments they would have no difficulty in getting speedy settlements and not want provisions in contracts for the payment of interest on overdue accounts.

(To be continued.)

THE LONDON MASTER BUILDERS' ASSOCIATION.

MONTHLY REPORT.

THE ordinary meeting of the Council was held at the offices of the Association on Thursday, the 18th inst., when the President, Mr. Walter Lawrence, jun., occupied the chair. There was a large attendance, and very important business was considered.

Since the last ordinary meeting on November 20 last two special Council meetings have been held for the purpose of considering what action should be taken to deal with the frequent occurrence of strikes in the building trade which have taken place during the past six months, and which were in distinct contravention of the rules quite recently entered into with the various trade societies.

As a result of the deliberations a special general meeting of the members of the Association was held on Monday, the 15th inst., and was very fully attended, when a decisive course of action was decided upon.

The Council, at its meeting on Thursday, recognising the urgency of the matter, resolved unanimously to request the attendance of representatives of the nine societies with whom working rule agreements exist to a Conference on Tuesday, the 23rd inst., whereat they were to be asked to give the necessary guarantee required.

The Reports of the Law and Parliamentary, Finance and Special Committees were adopted.

The professional auditors were duly appointed to audit the accounts for the year ending December 31.

A number of new members were elected, and applications for ordinary membership were received and recommended to the next Council for election.

Correspondence and trade matters were duly considered.

INSURANCE OFFICES, LEADENHALL-STREET.

Extensive premises for the London and Lancashire Fire Insurance Company, Ltd., with suites of offices on the upper floors, are being erected at the Bishopsgate end of Leadenhall-street, E.C. The architect is Mr. M. E. Collins, F.R.I.B.A., Old Broad-street, E.C., and the general contractors are Messrs. Trollope & Colls, Ltd., Coleman-street, E.C. The steelwork is by Messrs. Richard Moreland & Son, Ltd., Goswell-road, E.C.

WAGES IN THE BUILDING TRADE.

BARNSLEY.—The carpenters and joiners have given notice of a demand for an increase in wages of 1d. per hour (8½d. to 9½d.).

BARROW-IN-FURNESS.—An advance of ½d. per hour (9¼d. to 9¾d. in summer and 9½d. to 10d. in winter) will be paid to the carpenters and joiners on and from January 1, 1914. The masons also receive an advance of ½d. per hour (9¼d. to 9¾d.) from the same date.

BOLTON.—The plumbers have been granted an increase in wages of ½d. per hour (9½d. to 10d.) as from January 1, 1914.

COLNE VALLEY.—The joiners in this district are demanding an increase in wages of 1½d. per hour (8d. to 9½d.).

GRANTHAM.—On and after January 1, 1914, an increase in wages of ½d. per hour (4½d. to 5d.) will be paid to the labourers in this district.

RADCLIFFE.—An advance of ½d. per hour (9½d. to 10d.) has been granted to the plumbers as from January 1, 1914.

RUGBY.—The following advances are notified to take effect in this district as and from January 1, 1914:—Plumbers, 9d. to 9¼d.; plasterers, 8½d. to 8¾d.; painters, 8d. to 8¼d.; and labourers, 5½d. to 5¾d.

SHREWSBURY.—On and after January 1, 1914, an advance in wages of ¼d. per hour (8½d. to 8¾d.) will be paid to the bricklayers.

STROUD.—An advance of ½d. per hour will be paid to the workmen engaged in all trades in this district as from January 1, 1914. The present rates are as follows:—Masons, bricklayers, carpenters and joiners, plasterers, slaters, and plumbers, 7d. per hour; painters, 6½d per hour; and labourers, 4½d. per hour.

PROPOSED NEW BUILDINGS AND OTHER WORKS.*

IN these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works, at the time of publication, have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; L.G.B. for Local Government Board; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ABERDEEN.—Plans passed:—Shop at rear of dwelling-house and shops on the south side of Hollybank-place at its junction with Hardgate, for Mr. John Wallace, merchant, per Mr. John Cameron, architect; dwelling-house on the south side of Westburn-road, for Mrs. R. Stuart, 85, Leslie-terrace, per Mr. George Watt, architect; and alterations in connection with the premises No. 260, Union-street, for Messrs. A. B. Robertson & Son, plumbers, per Messrs. Kelly & Nicol, architects.

Bishop's Stortford.—The U.D.C. have decided upon a new sewerage scheme for the Hockerill District, estimated to cost £3,000.

Bracebridge.—The U.D.C. have passed plans for a proposed new street to be called Elder-street, and for the extension of Beech-street, as far as the north side of a proposed new street to be called Poplar-street.

Broadstairs.—Plans passed by U.D.C.:—Additions (lavatory) to Elmwood for Lord Northcliffe; garage in King Edward-avenue for Mr. C. Philpott; alterations and additions to house, Lindenthorpe-road, for Mr. G. H. Fuggle; new roads near Crow-hill and Lindenthorpe-road for Mr. C. E. Doughty.

Cardiff.—Lord Bute has offered 6½ acres of land to the T.C., at £30 per acre ground rent, for the building of workmen's houses.

Cardigan.—Cinema in Priory-street for Mr. Crecraft.

Chester.—Mr. William Williams, The Croft, Newton, proposes to build a picture house on a vacant plot of land in Walker-street, Hoole. Mr. R. C. Davies is the architect.

Chichester.—The T.C. have passed plans for a bacon factory for the Bacon Factory Society.

Cookham.—Plans passed by R.D.C.:—Mr. W. Bullock, additions to Taurmead, Boulter's Lock; Mr. J. W. Gray, detached house Maidenhead Thicket.

Crookham.—Bungalow for Mr. A. G. Lunn.

Darlington.—The R.D.C. have passed plans for alterations to the Bay Horse Inn, Haughton-le-Skerne, and an amended plan for attic bedrooms and loose boxes at Red Hall.

Dundee.—Plans for the reconstruction of the Harris Academy have been passed.

Edinburgh.—The Dean of Guild Court have granted warrants to the North British Railway Company for a bridge, etc., near Brighton-place, Portobello, and St. Cuthbert's Co-operative Association, Ltd., for a laundry at Chesser-avenue.

Egham.—Plans for a new house have been passed for Sir Charles Cameron at Englefield Green, and for a cottage on Cooper's-hill for Lady Cheylesmore.

Ely.—Plans passed:—Mrs. S. G. Poole, dwelling-house in Barton-road; Mr. H. Roythorne, dwelling-house in Chapel-street; Mr. S. Beckett, proposed alteration to cowshed in West End, occupied by Mr. Abraham Smith; Mr. H. Drake, Annesdale, motor-shed.

Fleetwood.—Eleven houses are to be erected in Carr-road, Tennyson-road, and Dryden-road for Mr. M. Pilling.

Foleshill.—Plans have been approved for six houses in Benthall-road, Foleshill, for Messrs. Whiteman & Clarke, and a house in Saunders-avenue, Bedworth, for Mr. Spencer.

Gainsborough.—The U.D.C. have received a letter from Mr. W. Boynton, of Moortown, Lincoln, who recently purchased the Lea Hall Estate at Gainsborough. Mr. Boynton stated that he proposed to develop the estate for building purposes, especially on Lea-road, as speedily as possible, and he would be glad to know if the Council would extend the water and sewerage systems half a mile or so further. It has been decided to inform Mr. Boynton that the Council favoured his proposals, and would assist him as far as they legally could.

Gateshead.—The E.C. have resolved to build a two-story school in King Edward-street with 700 places for mixed and infants' departments.

Grays.—Mr. Midgley Taylor has prepared plans for a sewerage scheme for the Thurrock, Grays, and Tilbury Joint Sewerage Board. The estimated cost is about £90,000.

Greenock.—Plans have been passed for a two-story building in Roxburgh-street for the Greenock Central Co-operative Society.

Gwynfai.—The L.G.B. have adopted a determined attitude towards the U.D.C. in the matter of providing suitable workmen's dwellings at the quarry villages of Clwtybont and Ebenezer. An order has been received compelling them within a period of nine months to build thirty-six houses, with a living-room, a scullery, and not fewer than three bedrooms.

Hemel Hempstead.—The L.G.B. have held an inquiry into the application of the T.C. for leave to borrow £6,100 for the purposes of a scheme under Part III. of the Houses of the Working Classes Act for the purchase of land and for the erection of working-class dwellings. Plans passed:—Mr. F. G. Stevens, additions, 53, St. John's-road; Mr. J. Clark, house, Lawn-lane; Messrs. G. W. Gruggen and J. H. I. Hopkins, additions, Gadebridge Park; Mr. J. Nelson, additions, 51 and 53, Puller-road.

Heywood.—Plans approved:—Heywood Industrial Co-operative Society, Ltd., addition to boot shop, Market-place; Mr. H. O. Hill, presbytery, St. Joseph's New Church; Messrs. Pilkington & Co., Ltd., drying-shed, off Seymour-street.

High Wycombe.—Plans passed:—Addition to chair factory, Baker-street, for Mr. H. Garland; additions to engine-house, Hatters'-lane, for Messrs. Young & Co.; three houses, Harlow-road, for Messrs. Hunt & Sons; alteration to two houses, Hatters'-lane, for Messrs. Young & Co.; motor garage, Amersham Hill, for Mr. W. Birch; offices, Newland, for Messrs. Spicer & Son.

Hindley.—Plans passed:—Billiard-hall at Platt Bridge for Mr. M. Hartley; salting place at Atherton-road for Mr. W. Baxter.

Ilford.—The L.G.B. have held an inquiry into the application of the U.D.C. for sanction to a loan of £21,578 for the purchase and erection of a refuse destructor on a site in Suffolk-road, Seven Kings.

Isle of Wight.—Plans passed by the R.D.C.:—House at Locks-lane, Newtown, for Mr. T. King; additions to St. Denis, High-street, Bembridge, for Messrs. Love & Sons; Hengistbury, Totland, for Mr. J. Newland; Heatherdown, Totland, for Dr. W. Kidd; West Billingham Farm for Sir Charles Seely; and Sealands, Blackgang, for Mr R. Pinnock.

Kirkby-in-Ashfield.—The L.G.B. have held an inquiry into the U.D.C.'s application for sanction to borrow £3,000 for the purpose of erecting a refuse destructor.

Liverpool.—The Mersey Docks and Harbour Board have decided to increase the length of the proposed river-entrance lock leading to the new Gladstone half-tide dock from 870 ft. to 1,070 ft., at an estimated additional cost of £118,000.

London C.C.—The E.C. propose erecting a new school at Wandsworth to accommodate 1,000 children, and to rebuild Winchester-street Infants' School, Finsbury.

Lowestoft.—Plans passed:—Mr. S. W. Turner, additions to bakery, Queen's-road; Mr. C. H. Jones, mangling-room (C.I.), Prairie Laundry; Mr. F. W. King, cottages roadway rear the Avenue; Kelf, store, Alma-street; Mr. H. A. Holton, motor garage, Esplanade; Messrs. Mobbs Bros., eighteen houses, Crown-street; Messrs. Mobbs Bros., one house, Crown-street.

Margate.—Plans passed by T.C.:—Four houses, Warwick-road, Messrs. Reeve & Reeve; one house, Westonville-avenue, Mr. W. J. Ballard; two houses, Westonville-avenue, Mr. W. J. Ballard; one house, Northdown Way Estate, Mr. F. J. Doughty; one house, Godwin-road, Mr. F. J. Doughty; three houses, Devonshire-gardens, Messrs R. Elliott & Co.; bathroom, 24, Marine-terrace, Messrs. Anderson Bros.; bathroom, water-closet addition, and new shop front, 45, Northumberland-road, Messrs. Wood & Co.; additions to servery, Cliftonville Hydro, Messrs. Anderson Bros.; motor garage, Albert-road, Messrs. F. Jones & Son; rebuilding stable, Church-street, Mr. J. E. Baker; four houses, High-street, Garlinge, Mr. T. Wells.

Montrose.—Cottages in Palmerston-street for Messrs. J. & W. Craigie.

Newbury.—The L.G.B. have held an inquiry relative to a loan of £2,675, which is being sought by the T.C. for the purpose of enlarging and improving the method of sewage disposal.

Newcastle-on-Tyne.—The Licensing Justices have sanctioned structural alterations in respect of the Eldon Arms, Blackett-street; the Butchers' Arms, Shields-road; and the beerhouse, 106, Shield-street.

* See also our list of Competitions, Contracts, etc., on page 715.

RATES OF WAGES IN THE BUILDING TRADE.

THE following are the present rates of wages in the Building Trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur:—

——	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Masons' Labourers.	Bricklayers' Labourers.	Plasterers' Labourers.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Newcastle	10	10	10	10	9½	10	9	6¾	6¾	6¾
Sunderland	9½	10	9½	9½	9½	9	9	6¾	6¾	6¾
Darlington	9	9½	9	9½	9½	9	7½	6½	6½	6½
Stockton-on-Tees	9	10	9¾	10	9½	9	8½	7	7	7½
Bradford	9½	9½	9	9	9½	9	8½	6½	6½	6½
Halifax	9¾	9	8¾	8½	8½	9	8¼	6½	6½	6½
Hull	9¾	9½	9¾	9½	9½	9½	8½	7	7	7
Leeds	10	10	9½	9½	9	9½	8	7	7	7
Sheffield	10	9½	9½	9½	9½	9½	8	6½	6½	6½
York	9	9½	8¾	9½	9½	8½	7½	6½	6½	6½
London	11½	11½	11½	11½	—	1s.	9	7½	7½	7½
Brighton	8–9	8	8	—	—	—	—	—	—	—
Portsmouth	9	9	9	9	—	8	7½	6½	6½	6½
Southampton	8½	9½	9½	8	—	9½	8½	6½	6½	6½
Maidstone	9	9	9	—	—	9	7½	5½	5½	5½
Bristol	9½	9½	9½	9½	—	9½	9	6½	6½	6½
Plymouth	9	9	9	9	—	9	7½	6	6	6
Bath	7½	7½	8	8	7½	7½	7	5–5½	5–5½	5–5½
Cheltenham	8½	8½	8½	8½	—	8½	7½	5½	5½	5½
Exeter	8	8	7½	7½	7½	7½	6½	5	5	5
Gloucester	7¾	8¼	8½	7¾	7½	8¼	7½	5½	5½	5½
Hereford	7½	8	7½	8	7½	7	6½	5	5	5
Stroud	7	7	7	7	7	7	6½	4½	4½	4½
Blackburn	10	10	9¾	9	9½	9½	9½	6½	7	7
Bolton	10	10½	10	10½	9	9½	9	—	—	—
Liverpool	11	11	11	10	10	10	9½	6½	6½	6½
Manchester	10	10½	10⅓	10½	9	10	9½	6½	6½	7½
Oldham	10	10½	10	9½	9	10	9½	6	7	7½
Preston	9½	10	9½	9	8½	9	8½	5½	6	6
Birmingham	10	10	10	10½	9	10½	9	7	7	7
Derby	9½	9½	9	9	9	9	8	6	6	6½
Leicester	9½	9½	9½	10½	9	9½	8	7	7	7½
Nottingham	10	9½	9½	10	9	9½	9	7	7	7½
Norwich	8	8	8	8	8	8	6½	5	5	5
Cambridge	9	8½	8½	9	8	9	7	5½	5½	5½
Oxford	9	8	8½	8½	8	8½	7	6	6	6
Southend	9	9	9	9	Piece work	9	7	6	6	6
St. Albans	9	9	9	10	8½	9	8	6	6	6
Grays	—	10	10	—	—	—	8½	7	7	7
Cardiff	9½	9½	9½	9½	9½	9½	8½	6½	6½	6½
Swansea	9	9	9	9	8½	9	8½	6	6	6
Newport	9	9	9	9	8½	8½	8½	6	6	6
Chatham	8	9	8½	9	9	8½	7	5½	5½	5½
Birkenhead	11	11	11	10½	10	9½	9½	6½	6½	6½

The mason's rate given is for bankers; fixers usually ½d. per hour extra.

Newmarket.—Plans for a new cottage at Heathside (now owned by Mr. H. E. Beddington), cottages for Mr. F. Bibby on Londwade-road, and two loose boxes for Lord St. Davids at Exning have been approved.

Newport, Mon.—The Health Committee have passed plans for a new sewer along Corporation-road, from Messrs. Lysaght's works, extending 1¼ miles to the River Usk. The probable cost will be about £10,000.

Normanton.—The L.G.B. have sanctioned a further loan of £16,475 for the erection of seventy-six houses at Normanton, to let at 6s. a week, under the Housing of the Working Classes Act.

Orsett.—The R.D.C. have decided to appoint Mr. F. J. Winter, of Southend, to prepare plans and estimates in connection with the West Thurrock housing scheme.

Pontnewydd.—The Abertillery Pitch and Benzol Company, Ltd., have acquired a site at Pontnewydd for the erection of new works, and it is expected that operations will be commenced immediately.

Ramsbottom.—Plans passed by U.D.C.:—Branch bank at corner of Bridge-street and Crow-lane for Messrs. Williams Deacons Bank, Ltd.

Rhymney Valley.—The E.C. have decided to apply to the C.C. to erect a new infants' school at Abertysswg to accommodate 260 children. Plans have also been before the Committee for a new school to accommodate 600 children at Cefn Forest, Pengam, the site of the garden city buildings.

Riccall.—Bungalow for Mr. B. Camplejohn.

Rickmansworth.—Plans passed for alterations and additions, High-street, Rickmansworth, for the Home and Colonial Stores, Ltd., and detached house, Watford-road, for Messrs. Turner & Smith.

Rugby.—The U.D.C. have received a communication from the British Thomson Houston Company saying they were open to consider any proposals relating to the renting or guaranteeing of rents of houses that might be made by responsible parties, and if the Council decided to erect a number of houses, the company would be prepared to find tenants for them on such terms and for such periods as might be mutually arranged. Negotiations have proceeded towards the purchase by the Council of 54 acres of land in Clifton-road, and Mr. Whinfield, the owner, has offered the small estate to the Council for £8,500.

Ruislip.—Plans passed by U.D.C.:—Bake-house, Church-road, for Mr. H. J. Callow, submitted by Mr. J. Shaw; two bungalows, English Freeholds Estate, Northolt-road, submitted by Messrs. Humphreys, Ltd.; ten cottages off Rickmansworth-road for the Ruislip Manor Cottage Society, Ltd.; three house, Park-way, for Alderman W. Thompson, submitted by Mr. F. H. Mansford; eleven cottages, Manor-close, Ruislip, for Ruislip Manor Cottage Society, Ltd., submitted by Messrs. A. & J. Soutar; house, Ickenham-road, submitted by Mr. W. Watts.

Shirlett.—The Executive Committee of the Association for the Prevention of Consumption for the County of Shropshire are making arrangements for the extension of the King Edward Memorial at Shirlett so as to provide for fifty-four beds.

Skegness.—Plans passed:—Misses Herrick and Tubb, additions to house, Derby-avenue; Mr. C. B. Hamerton, house, Drummond-road; Messrs. Child & Harper, house, Seacroft-esplanade; Mr. H. Bentley, house, Drummond-road; Miss Broughton, alteration to house, Frederick-road; Mr. H. Wiltshire, two houses, Brunswick-drive; Messrs. G. Dunkley & Son, house, Albert-avenue; Mrs. L. J. Whiting, house, Sunningdale-drive.

Sleights.—The L.G.B. have held an inquiry into the application of the R.D.C. for sanction to borrow £5,700 for sewerage works.

Southend.—The T.C. have decided to provide a shelter below the Cliffs Bandstand enclosure at a cost of £3,519, and to apply to the L.G.B. for the sanction of the borrowing of £6,668 for making up a back passage in Hamlet Court-road and sections of Chalkwell Park-drive and Surbiton-road, and the making up and sewering of sections of Westcliff Park-drive and King's-road; and £920 for laying a new sewer in Ambleside-drive and Riviera-drive. Plans for a school-church in Leigh-road East for the Rev. A. Bell have been passed.

South Shields.—The L.G.B. have held an inquiry into the application of the R.D.C. to borrow £2,000 for works of sewage in the parish of Boldon.

Spalding.—The L.G.B. has held an inquiry into the application of the R.D.C. to borrow £2,470 for the water supply of Deeping St. Nicholas.

Stirling.—The T.C. have passed plans for the erection of new municipal buildings at an estimated cost of £21,000.

Walsall.—The T.C. are considering the building of a new electricity generating station.

Worthing.—A scheme for the development of the Beach House Estate, if it is purchased by the town, has been before the U.D.C. The proposal is to retain the Beach House and all property south of Brighton-road; to construct two 40-ft. roads on the land north of the Brighton-road, and to sell the frontages to these new roads.

Yeovil.—House at Bower Hinton for Mr. C. Gaylard. The R.D.C. have purchased a site at West Coker for the building of four houses.

Yarmouth.—Plans passed by T.C.:—Additions, Row 63½, for Messrs. Arno'ds; addition to shop, Pier Plain, Gorleston, for Mr. W. Hindle; three houses, Southtown-road, Mr. Frederick Juby; house and shop, Southtown-road, Mr. H. A. Lansdell; two houses, Royal-avenue, Mr. John Eastoe; carpenter's shop, Harley-road, Mr. Read; alterations, Queen's-road, Mr. F. Wenn; lock-up shops, St. Peter's-road, Mr. E. J. Middleton; lock-up shop, St. Peter's-road, Mr. G. W. Brewster; alterations, 29, Southtown, Mr. R. H. Teasdel.

GENERAL BUILDING NEWS.

BUILDING IN EDINBURGH.

A new Labour Exchange has recently been erected at Tollcross, under the supervision of Mr. W. T. Oldrieve, of the Board of Works. The building has cost about £7,000, and was erected by Messrs. J. Miller & Sons.

OFFICES, WESTMINSTER.

The new block of offices known as 3, Central-buildings, Matthew Parker-street, S.W., were designed and carried out under the superintendence of Mr. H. Chatfeild Clarke, F.R.I.B.A., Bishopsgate, E.C. The general contractors were Messrs. Ford & Walton, Ltd., Kilburn.

KILMACOLM CLUBHOUSE.

A new clubhouse has been erected for the Kilmacolm Golf Club from plans prepared by Mr. D. K. Michie. The building has cost £2,300, and contains smoke, dining, club, and ladies' rooms, etc. The builder was Mr. J. Keanie.

TRADE NEWS.

Messrs. Patman & Fotheringham, Ltd., 100 and 102, Theobald's-road, London, also of Park-street, Islington, N., have been successful in securing the following contracts:—Alterations and addition, Hotel Russell, Russell-square, W.C., for the Frederick Hotels, Ltd.; new warehouse, 9, Little Saffron-hill, for Messrs. A. W. Penrose & Co., Ltd.

WESTMINSTER CITY COUNCIL.

AT the fortnightly sitting of the Westminster City Council on December 18 the following matters were dealt with:—

King Charles I. Statue.—A letter was received from the Royal United Service Institution containing a resolution which had been passed to the effect that in the event of it being found necessary to remove the statue of King Charles I., now at Charing Cross, a suitable site for its erection, both historically and from a utility aspect, would be in the centre of Whitehall, immediately in front of the Banqueting House.

It was decided that the Royal United Service Institution be informed that, so far as the Council was concerned, no definite proposal had been put forward for the removal of the statue from its present site.

Street Widening.—The Improvements Committee recommended certain widenings of Wardour-street and Old Compton-street by the setting back of premises when rebuilt. The estimated cost was £20.000.

Mr. G. W. Lawrence moved that the widening of Compton-street be not proceeded with at present, and pointed out that in the thirteen years of the Council's existence £296,000 had been spent on improvements, and the present proposal, added to the commitments already undertaken, would bring the total to £415,000.

Mr. W. Davis (Chairman of the Committee) pointed out the great cost which would be incurred in the future if new premises were erected and then the street had to be widened.

The Committee's recommendation was adopted.

THE NEO-CLASSIC PHASE OF ENGLISH ARCHITECTURE:

THE CLASSIC TRADITION IN AMERICA.

THE tenth and concluding lecture by Mr. A. E. Richardson on the "Neo-Classic Phase of English Architecture" was delivered on the 18th inst. Mr. Richardson said:—

"The lines upon which American architecture was to develop had every connection with contemporary events in the Motherland, with certain reservations pre-ordained by distance, environment, and new conditions. During the period of early colonisation, and for a considerable time after the separation from English rule, it is easy to perceive the main impulses at work, shaping the local tradition in semblance of the main issue. We read of the English displacing the Dutch settler, of the prosperity of the Grand Colonial Period, of the shock of the War of Secession, of the War of 1812, of the rise of the United States to the rank of a world power. Through it all the English tradition is dominant. It is possible to go deeper into the question, to analyse that positive spirit of searching and invention which has imparted to American architecture its peculiar charm; or we can sound that remarkable and persistent strain of refinement which has enabled a comparatively new country to take a high place n the sphere of art. Our summing up is brief: the reticent Anglo-Saxon character is reasserting itself to-day with renewed energy.

This desire for fine architecture for its own sake, of architecture suited to each peculiar expression—nobly ordered—irresistible in its appeal to the intellect, was characteristic of the eighteenth century in England; its spirit was communicated to America at a time when that country was young and impressionable. The colonising power carried into its new *habitat* the thought and culture of an established civilisation. For nearly three hundred years new conditions have been at work, modifying and altering the varying influences from the Mother Country, millions of alien race have fused with the old stock, but still the dominant expression is English. The very conditions of the struggle to settle in a new land brought about a marked change in the system of imported architecture; at first stone forms were translated in terms of timber, and a curious phenomenon resulted, a degree of unparalleled refinement in building ensued, which we to-day conveniently name Colonial. No other British colony presents such tangible evidence of the value of sequence in tradition than that offered by the three stages of architectural evolution in America. To-day we are confronted with a further development based on what is acknowledged to be the indigenous American style. This recent growth, which is the product of the last decade, in its main tendencies, aspires to the academic, it borrows freely from Italian and French models, but its sympathies are entirely with the examples of civil architecture built by Englishmen who migrated to America a century ago.

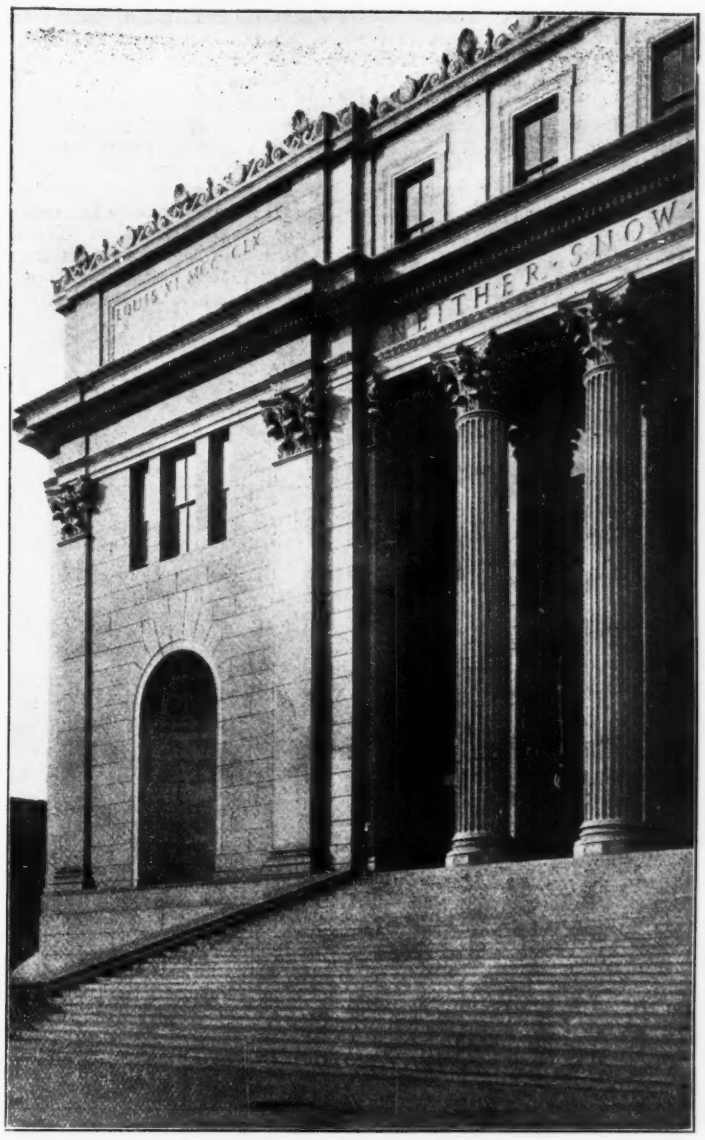
The whole story of the Colonial tradition, of the rise of civil architecture, and the enormous advance of modern American design is to-day acting as a stimulating creed to the arts in Europe. It means to England precisely what the artistic activity of the archaic Greeks who colonised Dorian Sicily, Magna Græcia, and the Ionian Cities of Priene, Miletus, and Ephesus meant to the culmination of Hellenistic art at Athens. America, with its unbounded resources, great commercial enterprise, and, latterly, a closer appreciation of the arts, has awakened in the Mother Country a fuller desire to improve the art of architecture.

Let us examine a little more fully the principal events and changes in American architectural history. We can, however, only deal with these briefly.

In the early beginnings of the tradition, when the newly-arrived immigrants first erected their small houses, the scarcity of masons to work stone brought about the literal transference of stone forms in wood. The Pickering House at Salem—erected in 1649, is a case in point. This design reflects a Jacobean interest. The fact that wood was used at first encouraged an ingenious and rich simplicity of taste, which reached its zenith during the great Colonial epoch of the second half of the eighteenth century. The simplicity and refinement of the buildings erected during that age, although anticipatory in a measure of the delicate style of the Adam Brothers, very nearly approaches the same spirit of cultured taste. The buildings erected in New England were mostly of wood, the use of this material directly shaping the forms of Colonial architecture along the east coast and in the towns. The architectural details of contemporary English work were considerably modified by this general employment of timber. The eighteenth century brought with it a striving for architectural elegance, and between the years 1725—1775 the increased population and wealth along the east coast occasioned a wider advance in design. Church building was undertaken in brick and timber during the reign of Queen Anne and the first two Georges, modelled on the church architecture of Sir Christopher Wren and James Gibbs. Such churches as the "Old South at Boston," Trinity at Newport, and St. Paul's at New York are representative examples. Christ Church, Philadelphia, built by Dr. Kearsley, the general composition of which recalls the work of Wren, and the steeple that of St. Martin's-in-the-Fields, by Gibbs, is remarkable considering its remoteness from the centre of taste, London. If we search for further material in this connection innumerable evidence abounds scattered through New England, Virginia, Maryland, and the Middle States. It should be noted that during the early days of the Colonial epoch trained architects such as flourished in England were practically unknown in America. Stonemasons, carpenters, and bricklayers, with well-thumbed

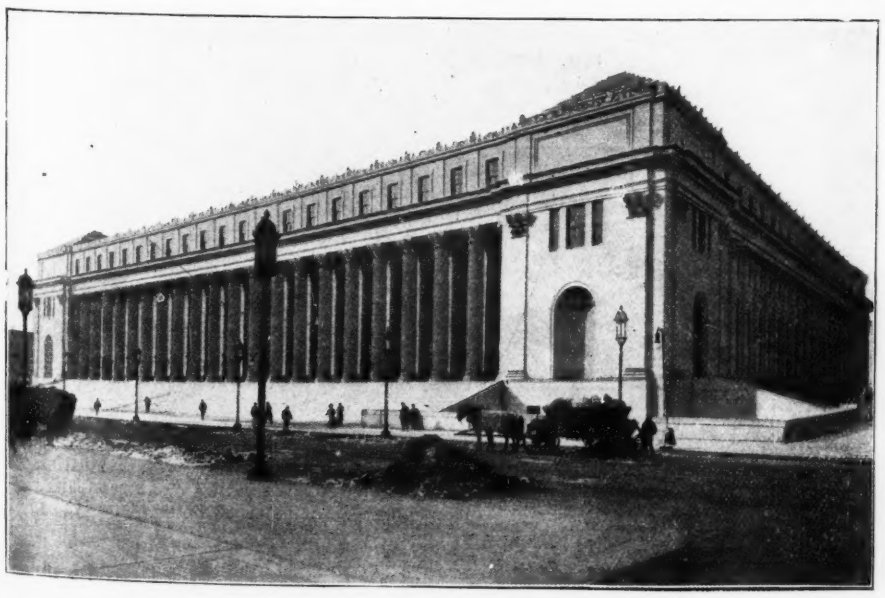
copies of Batty Langley's book, doctors and lawyers with Isaac Ware's complete "Body of Architecture," and others armed with "Carpenters' Jewels" and "Builders' Guides," ministered to the architectural needs of the community. There resulted a complete departure from the classic precision of English work, but the gain in vivacity of expression more than atoned for the lack of observance of orthodox methods. It appears that the cultured requirements of the old Colonial aristocracy in many instances demanded the importation of English joinery. At this period, 1720—1770, little or no architecture of civic pretension was in being, mainly accountable for by the fact that the Crown grants for public purposes were insufficient, and also that the development of the Colony was in an elementary stage. From the fine brick manor houses of Maryland and Virginia, with their extensive grounds and wrought-iron gates, following the great English mansions, the history of the Colonial aristocracy can be read. Such buildings as Westover, built in 1737, or Carter's-grove, in Virginia, and the Harwood and Hammond Houses at Annapolis, are worthy examples. We must not forget Longfellow's house, "Craigie," built in 1757. But by far the most interesting example is that built for Captain McPhædris, at Portsmouth, New Hampshire, in 1723. This structure closely follows the design of Eagle House at Mitcham; the bricks were imported from England. Indeed, at this period bricks were carried to America by the shipload from the Netherlands and the Mother Country. The cities of Philadelphia and New York and other of the smaller towns of the Middle States afford further evidence of architectural activity during the zenith of the Colonial period. The Morris House, in Philadelphia, is of a type encountered in almost every English country town. It should not be forgotten that the importation of English furniture during the eighteenth century, and especially the finer specimens in the taste of Chippendale, Adam, and Sheraton influenced architectural detail very considerably. I had almost omitted to include the most original and representative of Colonial examples, Mount Vernon on the Potomac, the home of George Washington. This really beautiful house, with its characteristic pillared piazza, wooden balustrading, and elegant cupolette, speaks strongly for Colonial achievement. As previously mentioned, the Colonial period is not remarkable for buildings of monumental scale; the building of churches alone gave scope to the colonists, and such public structures as were required were inexpensive and modest examples of good taste. The State House at Boston and the Faneuil Hall in that city, the Town Hall at Newport and Independence Hall at Philadelphia, the first American civic centre, are well known.

Between the period of the War of Secession and the later War of 1812 monumental architecture was developed to express the changed conditions of self-government and officialdom. The majority of the buildings erected at this juncture in the national history were for purposes of State and national administration. England still proved the storehouse from whence the architectural inspiration poured, although America's sympathies for the style Louis Seize at this period is discernible. The Old City Hall, New York, designed by McComb and Mangin in 1803-12, is proof of this transitory sympathy. At this point we must terminate our general conspectus of the tradition in favour of a brief *résumé* of the lives of the architects who aided the development of monumental architecture. The names of Dr. Thornton, Hoban, Hadfield, Latrobe, Strickland, Mills, Haviland, Bullfinch, Parris of Boston, President Jefferson, Isaiah Rogers. Ithiel Town, and Thomas Walter rank as among the pioneers of the formal Classic style.



New York City Post Office.

Messrs. McKim, Mead, & White, Architects.



New York City Post Office.

Messrs. McKim, Mead, & White, Architects.

On July 16, 1790, the capital of the United States of America was transferred from Philadelphia to Washington, and a new State Capitol was decided to be erected. The celebrated L'Enfant prepared his grand plan for the lay-out of the city, which is only just being realised in its entirety. Dr. William Thornton, "an ingenious, but wrong-headed physician," prepared the original plan, soon after George Hadfield, a young Englishman, was invited to continue the work. Hoban, an Irish carpenter, and Blagden, an English stonemason, also appear to have been interested in the scheme; but until Latrobe, a pupil of S. P. Cockerell, migrated to America the master mind for the completion of the structure was lacking. Walter carried out extensive additions, including the dome, between the years 1851-65. Between the period of Latrobe's and Walter's directorship Bullfinch was employed; his work appears to have centred about the Rotunda.

Robert Mills became a pupil of Hoban, and practised as an architect about the same time that President Jefferson was building the University Buildings in Virginia. The President loaned to Mills some of his architectural books, and Mills appears to have aided Jefferson in preparing plans for the President's proposed house at Monticello; the details were designed by Jefferson. After practising for several years Mills entered the office of Latrobe as a pupil, and studied engineering, and at a later date erected the Court House at Richmond. Mills was one of the pioneers who projected railways on the continent of America. He died in 1855.

Benjamin Latrobe, an Englishman, was born in 1762. He entered the office of S. P. Cockerell, a fact commented on by Professor Cockerell when referring to the design of the Capitol at Washington. Latrobe appears to have enjoyed a good rural practice in Sussex, but on the death of his wife he migrated to the estate of an uncle living near Philadelphia. His first buildings seem to have been erected on the banks of the River James. Soon after settling in the States he was appointed Engineer for Virginia, and

built the Bank of Pennsylvania. This he considered to be his best work. Latrobe, in his capacity of engineer, improved the defences and lighthouses on the east coast of America. Removing to Washington, he was appointed Surveyor of Public Works to the United States, and finished the north wing of the Capitol. Latrobe afterwards completed the Cathedral and Exchange at Baltimore. His son, B. H. Latrobe, also practised as an architect. Strickland became a pupil and follower of Benjamin Latrobe, and attained prominence as an architect.

At this point we must consider the career of another Englishman, George Hadfield.

Hadfield in 1784 received the first gold medal for the Travelling Studentship at the Royal Academy Schools. With Signor Colonna, in 1791, he made measured drawings of the Temple at Palestrina, near Rome (these are now at the Royal Institute of British Architects); and in 1795 he exhibited drawings of the Temple of Mars and of Jupiter Tonans.

Colonel Trumbull, an American officer, while on a visit to London, selected George Hadfield, under the authority of the Commissioners, for laying out the City of Washington, to superintend the building of the Capitol, but on account of a dispute between the architect and the Commissioners Hadfield left the public employment. His works include the design of the public offices, the City Hall, Custis's Mansion, the house of Commodore Porter, and the United States Bank. Hadfield died in 1826. Charles Bullfinch was appointed Architect to the Capitol on the resignation of Latrobe in 1818. He erected the Rotunda, improved the design of the east front, and practically finished the building.

John Haviland, 1793-1852, an Englishman, born at Taunton, in Somersetshire, studied under James Elmes. He journeyed to Russia and became acquainted with the American authorities, who invited him to America. In 1816 he left for the States, and there designed the numerous prisons in America on the radiating principle, which at a later period Sir Charles Barry boldly adopted in his design for the Pentonville Prison.

A. Parris, of Boston, 1780-1852, practised largely as an engineer. He built the markets and Court Houses and other public structures in the former city.

James Hoban was responsible for the design of the White House—a building of freestone, yearly painted white. This structure was burnt in 1814 and restored between 1815-18.

Thomas Walter, 1804, was a native of Philadelphia. In 1831 he designed the county prison; 1833-37, designed the Girard College (one of the finest Classic structures in America); 1838, visited Italy to study marblework for that building; 1851-65, carried out the extensive additions to the Capitol at Washington (the dome was designed in 1865); 1864, designed the New Treasury Building. Walter was one of the founders of the American Institute of Architects.

The next architect for consideration is Ithiel Town, 1784-1844, who practised in Connecticut in 1829; he took into partnership A. J. Davis; 1829, the State Capitol and Episcopal Church at Newhaven, City Hall at Hartforth (Connecticut), several important works in New York, the Customs House and United States Treasury, and other works too numerous to mention. Ithiel Town was a corresponding member of the Royal Institute of British Architects; many of his drawings are in the Institute Library.

The work of Isaiah Rogers, such as the Merchants' Exchange, New York, 1841, and the Custom House at Boston, are among other important works of the period.

It is worthy of remark that the architectural development characteristic of English architects during the first half of the nineteenth century should have had such a remarkable effect on the architecture of America. The requirements of that time in America for public structures were of such a character as to demand a monumental quality, and it is significant that the most recently erected Classic structures should in a measure revert in type to the earlier buildings of the tradition. The period from 1850 onward produced such giants as Hunt and Richardson, but progress was not general until the genius of McKim again elevated American architecture

Harvard Club, New York City.

(From the *Brickbuilder*.)

to the level of the academic platform. We could write folios on the modern development of Classic architecture in America, mentioning the names of several firms of world-wide prominence. But for the English-speaking race the name of one firm only is of consequence—Messrs. McKim, Mead, & White. A study of the work of this celebrated firm of modern architects will form the second part of this lecture.

The Future Development of Classic Architecture in England.

To rightly estimate the future development of architecture except through the media of current events presents many difficulties. It is only possible to vaguely hint at what may reasonably be conjectured to result from the activities of to-day. The progress of architecture records the intellectual stamina of the people in a way that nothing else can, and there is every indication in the spirit of the present age of a desire to further academic principles and banish provincialities from the design of buildings. At present, it must be confessed, we are a long way behind the best of America's achievements, and we are outclassed by the French in their handling of plan problems. Our own tradition of classic is falsely rendered and but little appreciated, few understanding that the spirit of the tradition alone need be considered, and not a base caricaturing of its finest models. We are again beginning to enlarge our artistic horizon by studying the classical masterpieces of every country, not with a view of exploiting the historical or modern side, but with the greater ambition in mind to emulate and excel those masterpieces which have aroused our cupidity. It is also becoming more apparent that mere picturesqueness and prettiness of effect are not the sole attributes of architectural expression; the laws of form, composition, character, and appropriateness need to be fully considered. The chaos of the last quarter of a century is being dispelled and a way out of the architectural maze is lit by the old classic truths. In a word, we have considerably advanced since the days of the last century in criticism if not in achievement. We are beginning to approach our architecture from the classic standpoint, in the fullest meaning of the term, to view dissimilar problems of design with that disinterested attachment which alone conduces to the making of fine architecture, to reason and apportion our buildings in sympathetic consonance, to dismiss meretricious and popular architecture and elevate intellectual design in the public estimation.

The possibilities attending architectural development from an observance of the foregoing theory are illimitable. If we ignore the convenient signposts of architectural literature which are introduced to divide a sustained movement into groups, and regard the whole range of architecture as a living and organic art, then and then only shall we be the better enabled to employ the symbols in use in our own time and fit them to specified requirements.

To quote Professor Cockerell: "The study of the beauties and defects of celebrated buildings should be the aim of the scholarly architect; this was the confirmation of theory, and led to that knowledge of form and combination which makes the accomplished architect. No man invented an order or a series of mouldings—these he accepts from the greatest and most reputed masters' works who have preceded him. He stores designs, books, and portfolios, and prides himself like the lawyer on his precedents and authorities. Absolute invention he never proposes to himself for a moment, but by a large study of history and examples he is enabled to detect the petty prejudices of schools, to emancipate himself from the trammels of nationality and fashion, and to regard the works of all times and countries as subject to his own use so far as they may be conformable to strength, convenience, and beauty."

To this valuable extract from one of the Professor's lectures must be added a word with regard to the faculty of criticism. The critical power is of much lower rank than the creative, but it is none the less important. The merciless criticism to which the work of the Greek architects was submitted resulted in the maintenance of a high standard of perfection. If constructive criticism were to be more freely outspoken in this country I venture to say that due regard would be paid to the elimination of such superfluous trappings and tawdry ornamentations which disfigure the majority of modern buildings. I refer more particularly to those cartloads of rubbish, broken pediments, cartouches of the crustacean order, grotesque masks, and bunches of exotic vegetables which have no direct argument in the embellishment of a structure.

I could pillory scores of buildings which masquerade under the title of classic; they are not even pseudo-classic. But it is satisfactory to note that this slipshod building manifestation is meeting with the opprobrium it so richly deserves.

The future is full of promise

Assistant Professor Leslie Wilkinson proposed a vote of thanks to the lecturer and summed up the series of ten lectures in a very able speech. The vote was carried unanimously amid general applause.

Pennsylvania Railway-Station.

(From the *Brickbuilder*.)

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, —; Auction Sales, xx. Certain conditions beyond those given in the following information are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

Competitions.

DECEMBER 31.—**London.**—GOVERNMENT BUILDINGS.—The Commissioners of H.M. Works and Public Buildings invite designs from architects in competition for new offices for the Board of Trade, etc., in Whitehall-gardens, S.W. For particulars, see issues for September 5 and October 17, and also advertisement in issue of September 5.

JANUARY 2, 1914. — **Manchester.**—NEW BUILDINGS AND ALTERATIONS.—The Board of Directors of the Manchester Royal Exchange, Ltd., invite architects to submit designs for additional new buildings and alterations on the existing Exchange buildings. See advertisement in issue for September 5.

FEBRUARY 1. — **Coventry.** — TECHNICAL INSTITUTE.—The Coventry Corporation invite competitive sketch plans for a Municipal Technical Institute at Pool Meadow.

MARCH 20. — **Belfast.** — ART GALLERY AND MUSEUM.—The Belfast Corporation invite designs for above buildings. Total cost not to exceed £75,000, of which only £30,000 will be spent at once. Assessor, Mr. John J. Burnet, A.R.S.A., LL.D. See advertisement in issue of November 7.

APRIL 1.—**Sofia.**—DESIGNS FOR A ROYAL PALACE AND LAW COURTS.—Particulars from the Commercial Intelligence Branch of the Board of Trade, Basinghall-street, E.C. See page 173, August 9, and page 350, September 27, 1912; also page 708, June 20.

APRIL 2. — **Ottawa.** — DEPARTMENTAL AND COURTS BUILDINGS. — The Department of Public Works, Ottawa, invite architects to submit sketch designs in a preliminary competition for above buildings. Six will be chosen from these for final competition. The five unsuccessful competitors will receive $3,000. The winner will be entrusted with the work. See particulars in issue for September 19 and advertisement in issue of September 12.

MAY 4.—**London.**—ST. PAUL'S BRIDGE.—The Bridge House Estates Committee of the Corporation of London invite designs from British architects for the architectural treatment of St. Paul's Bridge. Premiums, £300, £200, and £100 respectively. The assessor is Sir William Emerson, P.P.R.I.B.A. See advertisement in issue of December 12.

MAY 15.—**London.**—CONCRETE COTTAGE.—The proprietors of *Concrete and Constructional Engineering* invite architects and others residing in the British Empire to submit designs of a detached or semi-detached labourer's cottage. Premiums, 100 guineas, 50 guineas, 25 guineas, and two at 10 guineas. See advertisement in issue of December 12.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

DECEMBER 29. — **Boston.** — COTTAGES.—For the erection of a pair of cottages proposed to be built in Bicker Fen, about 2½ miles from Bicker Church, for Mr. William Sharpe, Hoffleet Stow, Bicker, Boston. Plans, etc., of Mr. Henry Kidd, Solent House, Kirton, Boston.

DECEMBER 29. — **Norwich.** — WORKSHOP.—The Norwich Corporation invite tenders for the erection of a workshop building in Duke-street. Quantities, etc., of Mr. F. M. Long, City Electrical Engineer, Duke-street, Norwich. Deposit, £1 1s.

DECEMBER 30. — **Leeds.**—TRAMWAY SHED.—The Leeds City Council invite tenders for the erection of a new tramway-shed and other buildings at Guiseley. Applications to Mr. Sidney Kitson, architect, Lloyds Bank-chambers, Vicar-lane, Leeds. Deposit, £2 2s.

DECEMBER 31. — **Northampton.** — ALTERATIONS, ETC.—The Corporation invite tenders for alterations and additions to the Welford-road Hospital. Quantities, etc., of Mr. A. Fidler, Borough Engineer, Guildhall, Northampton.

JANUARY 1, 1914 — **Athea.** — CREAMERY. — The Athea Co-operative Creamery Company invite tenders for the erection of a creamery at Athea according to the plans, etc., of Mr. J. D. Leahy, Newcastle West. Mr. W. Cleary, Secretary of the Company, Athea, Co. Limerick.

JANUARY 1.—**Neath.**—MOTOR GARAGE.—For the erection of a large garage at Windsor-terrace, Neath, for Messrs. N. Hedge & Sons, motor and cycle agents, Neath. Quantities of Mr. J. Cook Rees, M.S.A., Parade-chambers, Neath.

JANUARY 2.—**Alsager.**—PUMPING STATION, ETC. —The Alsager U.D.C. invite tenders for the erection of pumping station and two cottages complete at the Oak Farm, and covered concrete reservoir complete at Mere Lake. Quantities, etc., of the Engineer, Mr. F. W. Stocks, F.S.I., Town Hall-chambers, Middlewich. Deposit, £2 2s.

JANUARY 3. — **Ennis.** — DISPENSARY.—The Co. Clare Insurance Committee invite tenders for provision of central dispensary at Old Militia Barracks, Ennis, in accordance with plan and specification prepared by Mr. W. H. Allen, C.E., architect, The Terrace, Ennis, and bills of quantities prepared by Mr. T. F. Slevin, surveyor, 23, St. Stephen's-green, Dublin. Quantities of the architect. Deposit, £2 2s.

JANUARY 5. — **Egremont.**—WALL.—The U.D.C. invite tenders for the building of a boundary wall, railway gate, etc., at Moor Row. Specifications, etc., from the Surveyor, Town Hall, Egremont

★ JANUARY 5. — **London.** — DEMOLITION AND ALTERATIONS.—The Commissioners of H.M. Works, etc., invite tenders for the demolition of certain houses and alterations to others.

JANUARY 5.—**Hartlepool.**—TIMBER QUAY.—The North-Eastern Railway Company invite tenders for the construction of a timber quay at the north end of the Old Harbour at Hartlepool. Specification on personal application only to Mr. Charles Watson, the Company's Docks Engineer, Dock Office, Hull.

JANUARY 5. — **Sawbridgeworth.** — MUNICIPAL OFFICES.—The U.D.C. invite tenders for construction of a Council chamber and offices over their fire-station at Sawbridgeworth. Specification at Council Offices. Mr. W. Morris, Clerk, 15, Bell-street, Sawbridgeworth.

JANUARY 5. — **West Hartlepool.** — GANGWAYS, ETC.—The North-Eastern Railway Company invite tenders for the construction of two timber dolphins and approach gangways on the north and south sides of the new west entrance, West Hartlepool. Specification on personal application only to Mr. Charles Watson, the Company's Docks Engineer, Dock Office, Hull.

JANUARY 6. — **Birkenhead.**—PLASTERING.—The Guardians of Birkenhead Union invite tenders for plastering, etc., at the Union Infirmary. Specifications from the Steward, at the Infirmary, Derby-road, Birkenhead

JANUARY 6. — **Sheffield.** — FOUNDATIONS.—The Sheffield Corporation invite tenders for the foundations for three new boilers, base of chimney stack and two motor-houses, comprising chiefly excavations in rock, brickwork, concrete, and structural steelwork. Quantities, etc., of Mr. S. E. Fedden, General Manager and Engineer, Commercial-street, Sheffield. Deposit, £2. 2s.

JANUARY 7.—**Beyton.**—FARM BUILDINGS, ETC.— The West Suffolk C.C. invite tenders for the erection of a cottage, set of farm buildings, and provison of water supply at Beyton. Specification from the County Architect, Mr. A. A. Hunt, M.S.A., at 51, Abbeygate-street, Bury St. Edmunds.

JANUARY 7. — **Lewisham.**—TANK.—The Lewisham B.C. invite tenders for a reinforced concrete storage tank at the Public Baths, Ladywell. Particulars of the Borough Surveyor, Town Hall, Catford, S.E.

JANUARY 7. — **Staffordshire.**—SCHOOLS.—The Staffordshire E.C. invite tenders for the erection and completion of new Council schools at Armitage and Mavesyn Ridware (near Rugeley), to accommodate ninety and 128 children respectively. Mr. Graham Balfour, Director of Education, County Education Offices, Stafford.

JANUARY 7. — **Tolworth.** — LARDERS, ETC.—The Tolworth Joint Hospital District Board invite tenders for the erection of larders and cupboards at the Hospital, Tolworth. Specifications of Mr. A. Jessop Hardwick, F.R.I.B.A., Eagle-chambers, Kingston-on-Thames

★ JANUARY 9.—**Flintshire.**—RIFLE RANGE.—The Flintshire Territorial Force Association invite tenders for construction of stop butts, target-markers' galleries, repairing shop and stores, warden's house, officers' and man's quarters.

JANUARY 9. — **Holywell.** — DRILL HALL.—The Flintshire Territorial Force Association invite tenders for the erection of a drill hall at Holywell. Quantities of Messrs. J. H. Davies & Sons, 14, Newgate-street, Chester. Deposit, £1 1s.

JANUARY 9. — **Liverpool.** — WAREHOUSE.—The Great Western Railway Company invite tenders for alterations and additions to warehouse, etc., in Lightbody-street, Liverpool. Quantities at the office of the District Goods Manager, 11, James-street, Liverpool.

JANUARY 9. — **Rodington.**—FARM BUILDINGS.— The Salop C.C. invite tenders for the erection of a cottage and set of farm buildings about a mile from Rodington, near Wellington. Specifications from Mr. W. J. Pulford, County Land Agent, County Buildings, Shrewsbury. Deposit, £1 1s.

JANUARY 10.—**Northallerton.**—WASHING-ROOM. —The Wensleydale Pure Milk Society, Ltd., invite tenders for erection of large washing-room at the dairy, Northallerton, involving considerable amount of steel girder and concrete work. Specifications at The Dairy, Northallerton. Mr. C. W. Walker-Tisdale, General Manager.

JANUARY 10. — **Stebbing.** — BRIDGE. — The Dunmow R.D.C. invite tenders for repairs to Parsonage Bridge, Stebbing. Specification etc., of Mr. A. E. Floyd, Clerk, Dunmow.

★ JANUARY 11. — **London.** — ALTERATIONS.—The Commissioners of H.M. Works, etc., invite tenders for alterations to the Store Yard.

JANUARY 14. — **Bournemouth.**—CONVENIENCES, ETC. — The Corporation of Bournemouth invite tenders for conveniences and shelters on the Undercliff Drive, west of Boscombe Pier, and shelters and cliff protection works on the promenade at Alum Chine. Particulars of Mr. F. W. Lacey, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth. Deposit, £1 1s.

★ JANUARY 14.—**Richmond.**—COOKERY CENTRE. —The Richmond T.C. invite tenders for the erection of a cookery centre.

★ JANUARY 15. — **Kent.** — ASYLUM.—The Kent County Lunatic Asylums Committee invite tenders for erection of two blocks of buildings.

JANUARY 16. — **Warrington.** — SCHOOL. — The Sites and Buildings Committee invite tenders for the erection of a public elementary school, to be known as the Oakwood-avenue Council School. Quantities, etc., from the Education Office, Warrington. Deposit, £1 1s.

JANUARY 17.—**Newport Pagnell.**—COTTAGES.— The Newport Pagnell R.D.C. invite tenders for the erection of eight houses at Loughton. Specifications, etc., of Mr. W. J. Budds, the Council's Surveyor, North-street, Bradwell, Wolverton. Deposit, £1 1s.

JANUARY 17. — **Radcliffe.**—HOUSES.—The Radcliffe U.D.C. invite tenders for the construction of sixteen dwelling-houses (in eight blocks of two each) on the Stand-lane site. Specification, etc., of Mr. W. L. Rothwell, Engineer and Surveyor, Council Offices, Radcliffe, near Manchester. Deposit, £1. 1s.

JANUARY 19.—**Pontypridd.**—ALTERATIONS.—The Pontypridd B.G. invite tenders for extensive alterations and additions to the Pontypridd Workhouse, including the erection of new male and female receiving wards, porter's lodge, dining hall, kitchens, new laundry, drainage, and extensive internal alterations and additions. Specification, etc., after the 24th inst., at the offices of the Guardians' Architects, Messrs. Arthur Ll. Thomas and Gomer S. Morgan, 23, Gelliwastad-road, Pontypridd. Deposit, £3. 3s.

JANUARY 30.—**Egremont.**—HOUSES.—The Egremont U.D.C. invite tenders for the erection of seventy-six working-class dwelling-houses, and the construction of roads, sewers, etc. Specifications, etc., of Mr. J. S. Stout, architect, 36, Lowther-street, Whitehaven. Deposit, £5 5s.

★ FEBRUARY 4.—**London.**—REPAIRS, ETC.—The Commissioners of H.M. Works, etc., invite tenders for repairs, etc., to buildings in their charge.

NO DATE.—**Carbury.**—HOUSE.—For the building of a dwelling-house in the King's County. Mr. H. C. Tyrrell, Ballinderry, Carbury, Co. Kildare.

NO DATE.—**Faringdon.**—FLOOR.—For the provision of a new spring floor for dancing, a portion of it to be adaptable for the large savings bank room at the Corn Exchange. Particulars of the directors, care of Mr. W. C. Sell, Marlborough-street, Faringdon.

NO DATE. — **Hull.**—PICTURE PALACE.—For the erection of proposed "Strand" Picture Theatre, Beverley-road, Hull. Messrs. Wellsted, Dossor, & Wellsted, architects, Waterloo-chambers, Hull.

NO DATE.—**Onllwyn.**—HOUSES.—For the erection of twelve houses at Maesmarchog, Onllwyn, for the Maesmarchog Building Club. Specifications, etc., of Mr. J. Cook Rees, M.S.A., Parade-chambers, Neath

[Those with an asterisk (*) are advertised in this issue.]

ENGINEERING, IRON, AND STEEL.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

DECEMBER 31. — **Dublin.**—STREET LAMPS.—The Public Lighting Committee of the Dublin Corporation invite tenders for the supply of street-lamp pillars and brackets, to be supplied in lots of 100 as required. Specification of Mr. Henry F. Cotton, Superintendent of Public Lighting, Tara-street, Dublin. Deposit, 10s.

DECEMBER 31. — **Halifax.**—TROLLEY WIRE.—The Tramways Committee of the Halifax Corporation invite tenders for the supply of 10 miles of trolley wire. Particulars of the Tramways Engineer, Skircoat Depôt, Halifax.

DECEMBER 31. — **India.** — SLEEPERS, ETC.—H.H. the Nizam's Guaranteed State Railways Company, Ltd., invite tenders for the supply of (*a*) 88,569 transverse steel sleepers for 85 lb. F.F. rails and 382,061 steel keys; and (*b*) 12,942 steel 85 lb. F F. rails in lengths of 39 ft. 6 in., forty-two ditto of 39 ft., 13,367 pairs of steel fishplates for above. Specifications at the company's offices, Winchester House, Old Broad-street, E.C. Deposit, 10s. each.

JANUARY 1, 1914. — **Dungannon.** — LIGHTNING CONDUCTOR.—The B.G. invite tenders for the repair of the lightning conductor at the Workhouse premises. Mr. W. M'Griffin, Clerk, Board-room Dungannon.

JANUARY 7. — **Darlington.** — GASWORKS.—The Corporation of Darlington invite tenders for the erection of a steel coal store roof, railway gantries, inspection chambers, etc., at their Gas Works. Specification, etc., of Mr. Frank P Tarratt, Gas Works Engineer, at the Gas Works. Deposit, £2. 2s.

JANUARY 7.—**Warrington.**—STEEL PIPES.—The Electricity and Tramways Committee invite tenders for weldless-steel pipes for feeding boilers. Specification of Mr. F. V. L. Mathias, M.Inst.E.E., Borough Electrical and Tramways Engineer, Howley, Warrington. Deposit, £1 1s.

JANUARY 8.—**Swansea.**—ELECTRIC APPARATUS.—The Corporation of Swansea invite tenders for one or two years' supply and delivery of (*a*) motors; (*b*) starting switches. Specifications from Mr. C. A. L. Prusmann, Borough Electrical Engineer, Guildhall, Swansea. Deposit, £1. 1s.

JANUARY 10. — **Manchester.** — LAUNDRY MACHINERY.—The Guardians of South Manchester invite tenders for the supply and fixing of the laundry machinery required at their Sanatorium at Abergele, North Wales. Particulars of Dr. Craig, Medical Superintendent at the Sanatorium.

JANUARY 12. — **Northampton.** — TRAMWAYS.—The Corporation invite tenders for the construction of a double line of tramways to Far Cotton and the doubling of a section of the Kingsthorpe route, together with the necessary overhead equipment, underground feeders, telephones, etc. The equivalent length of single track is about 3 miles. Specifications, etc., of Mr. Alfred Fidler, M.Inst.C.E., Borough Engineer, Guildhall, Northampton. Deposit, £5.

JANUARY 12. — **Warrington.** — TRANSPORTER BRIDGE.—The Directors of Messrs. J. Crosfield & Sons, Ltd., are prepared to receive tenders for the works included in contract No. 1 for a transporter bridge over River Mersey. The works comprise foundations, docks, etc., for the bridge, and railway sidings, etc., for the approaches thereto. Quantities, etc., of Mr. W. H. Hunter, M.Inst.C.E., 42, Spring-gardens, Manchester. Deposit, £2 2s.

JANUARY 13.—**London.**—ELECTRIC LIGHTING.—The L.C.C. invites tenders for an electric lighting installation at the Popham-road Elementary School, South Islington, comprising about 130 lighting points. Specification, etc., of the Chief Engineer of the Council, Mr. G. W. Humphreys, at the County Hall, Spring-gardens, S.W. Deposit, £1.

JANUARY 14. — **Bootle.** — IRON RAILINGS.—The Bootle Corporation invite tenders for the supply and erection of wrought-iron railings in the South Recreation Ground. Mr. J. H. Farmer, Town Clerk, Town Hall, Bootle.

JANUARY 14.—**London.**—LAUNDRY MACHINERY.—The Metropolitan Asylums Board invite tenders for the installation of certain new machines and rearrangement of existing laundry machinery, etc., at the Brook Fever Hospital, Shooter's-hill, Woolwich, in accordance with drawings and specification prepared by Mr. W. T. Hatch, M.Inst.C.E., M.I.Mech.E., Engineer-in-Chief. Specification, etc., at the office of the Board, Embankment, E.C. Deposit, £1.

JANUARY 14.—**St. Albans.**—ELECTRIC INSTALLATION.—The Guardians of the St. Albans Union invite tenders for an electric lighting installation at the workhouse and infirmary. Specification of Mr Ernest F. W. Hieatt, Clerk to the Guardians, Union Offices, Chequer-street, St. Albans.

FEBRUARY 16.—**Warsaw.**—ENGINES AND PUMPS.—The Municipality of City of Warsaw invite tenders for the delivery and erection in working order of two vertical compound engines, with plunger, piston, or differential pumps, or of two turbines with centrifugal or turbo-pumps, each capable of delivering 500 litres per second (6,600 gallons per minute) at lifts between 30 and 37 meters, the normal lift being 31·5 meters, with travelling crane and accessories. Conditions, etc., from the Comité de la Canalisation et d'Alimentation d'eau, Hotel de Ville, Varsovie, on payment of 5 roubles, or at the office of the Engineer-in-Chief, Sir William H. Lindley, 29, Blittersdorffsplatz, Frankfort-on-Main.

FURNITURE, PAINTING, MATERIALS, etc.

DECEMBER 27.—**Burnley.**—STORES.—The Water Committee invite tenders for the supply of navvy barrows, etc.; general stores and materials; oils, tallow, grease, etc., required at the Hurstwood Reservoir Works for a period of six months. Specifications of Mr. Peregrine Thomas, Town Clerk, Town Hall, Burnley.

DECEMBER 29. — **Camborne.** — STORES.—The Grenville United Mines, Ltd., Camborne, invite tenders for supplying materials for a period of twelve calendar months from January 1, 1914. Mr. H. Battens, manager, Grenville United Mines, Ltd., Camborne.

DECEMBER 30. — **London.**—WOOD BLOCKS.—The L.C.C. invites tenders for the supply of Jarrah wood and creosoted deal paving blocks during twelve months commencing aproximately December 31, 1913. Form of tender, etc., on application to the Chief Officer, London County Council Tramways, 62, Finsbury-pavement, E.C.

DECEMBER 31. — **Aberystwyth.**—MATERIALS.—The T.C. of Aberystwyth invite tenders for goods and materials that may be required during the year 1914. Particulars at the Borough Surveyor's Office, Smithfield-road.

DECEMBER 31.—**Harwich.**—ROAD MATERIALS.—The Corporation invite tenders for the supply of broken granite (about 700 tons) delivered free at Harwich Quays; also for best Kentish flints, broken to 2-in. gauge, and delivered free alongside Harwich Quays. Mr. F. Harold French, Borough Surveyor, 41, Church-street, Harwich.

DECEMBER 31. — **Romford.**—FIRE APPLIANCES.—The Romford U.D.C. invite tenders for the supply of the following fire appliances, viz.:—Fire escape, 35 ft.; Slingsby steelback ladder, 20 ft.; quadricycle; 500 ft. canvas hose with fittings; hand pump (Heathman's) with 30 ft. hose; standposts, branches, lamps (Vaclite), and sundry tools and effects. Forms of tender of Mr. Charles T. King, Clerk, Council Offices, Romford.

DECEMBER 31. — **Rotherham.** — TAR-SPRAYING MACHINE.—The Rotherham R.D.C. invite tenders for the supply of a tar-spraying machine of about 160 gallons capacity, with all necessary appliances. Mr. R. Bradbury, District Surveyor, Imperial-buildings, Rotherham.

JANUARY 3, 1914.—**South Stoneham.**—GRANITE.—The South Stoneham R.D.C. invite tenders for the supply of British macadam Forms of tender of the District Surveyor, Mr. F. Heather, "Chevin Side," Old Portswood, Southampton.

JANUARY 5. — **Ventnor.** — MATERIALS. — The U.D.C. invite tenders for one year's supply of road materials, cement, etc. Mr. W. Tozer, Clerk, Town Hall, Ventnor.

* JANUARY 6.—**Brentford.**—BROKEN GRANITE.—The Brentford U.D.C. invite tenders for supply of 300 yds. blue Guernsey or other approved granite.

JANUARY 7. — **Bishop Auckland.**—PAINTING.—The Auckland, Shildon, and Willington Joint Hospital Board invite tenders for painting and enamelling the walls, etc., of the Tinsdale-crescent and Helmington-road Hospitals. Specifications, etc., of Mr. R. B. Thompson, architect, Market-place, Bishop Auckland.

JANUARY 7.—**Edinburgh.**—MOTOR-OMNIBUSES.—The Corporation of Edinburgh invite tenders for the supply and delivery of motor-omnibuses, not exceeding six. Specification from Mr. A. Horsburgh Campbell, M.Inst.C.E., Engineer, Parliament-square. Deposit, £2. 2s.

JANUARY 7.—**Manchester.**—TERRA COTTA.—The Manchester E.C. invite tenders for the supply of red terra cotta for extension to Municipal School of Art, Cavendish-street, C.-on-M., Manchester. Quantities, etc., of Mr. Thomas Hudson, Town Clerk. Deposit, £1 1s.

JANUARY 12 — **Mold.** — ROAD MATERIAL.—The Flintshire C.C. invite tenders for road materials for twelve months. Schedules, etc., of Mr. P. Evans, County Surveyor, Mold.

JANUARY 14.—**Uckfield.**—MATERIALS.—The Uckfield R.D.C. invite tenders for the supply of tar, tar bindings, etc. Particulars from Mr. E. W. Ray-Johnson, Highway Surveyor, Surveyor's Office, Buxted, Sussex.

JANUARY 17. — **Plymouth.** — MATERIALS.—The Plymouth Corporation invite tenders for materials, including bricks, pipes, etc., ironmongery, paints, varnishes, ironwork, plumbers' work, iron and steel, pitchpine, deals, flooring, etc., Portland cement, lubricating oils, tar and pitch, painters' brushes, watering, wood blocks, soft, creosote, road metal, etc. Schedules of Mr. James Paton, Borough Engineer and Surveyor, Municipal Offices, Plymouth. Deposit, £1.

JANUARY 19. — **Gloucester.**—ROAD MATERIAL.—The Gloucestershire C.C. invite tenders for the supply of stone for the main roads for one year. Mr. E. S. Sinnott, County Surveyor, Shire Hall, Gloucester.

MARCH 12. — **Aberdare.** — STORES. — The Directors of the Powell Duffryn Steam Coal Company, Ltd., invite tenders for the supply of the undermentioned stores from April 1, 1914:—Grease and oils, paints, etc. Forms of tender, etc., of the Stores Manager, Aberaman Offices, near Aberdare.

ROADS, SANITARY AND WATER WORKS.

DECEMBER 29.—**Rathdrum.**—SEWERAGE WORKS.—The Rathdrum R.D.C. invite tenders for the Kilpeddar Sewerage Works. Quantities of Mr. F. Bergin, Engineer, 36, Westmoreland-street, Dublin. Deposit, £1.

DECEMBER 29.—**Whitley.**—STREET WORKS.—The Whitley and Monkseaton U.D.C. invite tenders for the making up of the carriageway and footways of Relton-terrace, between Monkseaton Front-street and Percy-terrace. Quantities, etc., of Mr. A. J. Rousell, A.M.Inst.C.E., Surveyor to the Council, Council Offices, Whitley Bay.

DECEMBER 31. — **Harwich.** — STEAM ROLLING.—The Corporation of Harwich invite tenders for steam rolling in the borough as required during the year ending January 31, 1915. Specification of Mr. F. Harold French, Borough Surveyor, 41, Church-street, Harwich.

DECEMBER 31. — **Pontefract.**—STREET WORKS.—The Corporation invite tenders for the carrying-out of certain private street works in streets adjacent to Banks-avenue and Love-lane, Pontefract. Specifications, etc., of Mr. John E. Pickard, Borough Surveyor, Municipal Offices, Pontefract.

JANUARY 2, 1914.—**Skipton.**—ROAD WIDENING.—The R.D.C. invite tenders for road widening at Horton Lane End. Specifications, etc., of Mr. A. Rodwell, Surveyor, Skipton.

JANUARY 3. — **Bedwas.**—ROAD WIDENING.—The Bedwas and Machen U.D C. invite tenders for carrying out the necessary works in connection with the widening and improvement of Church-street, Bedwas. Specification, etc., of Mr. A. S. V. Taylor, Engineer and Surveyor, Surveyor's Office, Bedwas, Mon.

JANUARY 3.—**Blaydon.**—ROADS.—The U.D.C. of Blaydon invite tenders for draining, excavating, removing debris, levelling, metalling, channelling of a diversion (about 450 yds long) of the Derwent and Shotley main road at "The Slide," near Lockhaugh Lodge. Quantities, etc., of the Surveyor, Mr. George Symon, Blaydon-on-Tyne. Deposit, £1. 1s.

JANUARY 3.—**Farnborough.**—SEWERAGE WORKS.—The Farnborough U.D.C. invite tenders for the construction of two concrete sedimentation tanks, etc. Quantities of Mr. J. E. Hargreaves, Surveyor, Town Hall, Farnborough. Deposit, £3 3s.

JANUARY 3. — **Stafford.** — SANITARY.—The Stafford R.D.C. invite tenders for the removal and disposal of the ashes and house refuse from houses situate in Doxey for a period of twelve months. Mr. C. B. Wilton, Clerk to the Council, Council Offices, Market-square, Stafford.

JANUARY 3.—**Ulverston.**—STREET WORKS.—The Ulverston R.D.C. invite tenders for improvement works in Ruskand-road, Ferry Hawkshead-road, and Skelworth Bridge-road. Specifications of the Council's Engineer, Virginia House, 24, Queen-street, Ulverston.

JANUARY 5. — **Bedwellty.**—WATER MAINS.—The Bedwellty U.D.C. invite tenders for hauling and laying about 5,136 yds. of steel mains. Quantities, etc., of Mr. Dan. H. Price, Engineer and Surveyor to the Council, Aberbargoed. Deposit, £2. 2s.

JANUARY 5. — **Bedwellty.** — GAS MAINS.—The Bedwellty U.D.C. invite tenders for hauling and laying about 1,860 yds. of steel mains. Quantities, etc., of Mr. Dan H. Price, Engineer and Surveyor to the Council, Aberbargoed. Deposit, £2. 2s.

JANUARY 5.—**Pontypridd.**—SEWER.—The Pontypridd U.D.C. invite tenders for the construction of about 140 yds. of 6-in., 330 yds. of 9-in. stoneware sewer, and 30 yds. of steel tube sewer, together with the necessary manholes, lampholes, etc., in connection therewith, at Lock Lewis, Rhydfelen, Pontypridd. Quantities of Mr. W. E. Lowe, Engineer and Surveyor to the Council, Municipal-buildings, Pontypridd. Deposit, £1. 1s.

JANUARY 6. — **Gidea Park, Romford.** — STREET WORKS. — The Essex C.C. invite tenders for making-up road at Gidea Park, Romford. Quantities of Mr. P. J. Sheldon, County Surveyor, Chelmsford.

JANUARY 6. — **Rochester.** — DRAINS.—The Corporation invite tenders for laying about 370 lineal yds. of 9-in stoneware pipe drains, 275 lineal yds. at St. Margaret-street, and 95 lineal yds. at Lockington-grove. Specifications, etc., of Mr. William Ranks, A.M.Inst.C.E., City Surveyor, Rochester.

JANUARY 6. — **Whitehaven.**—WATER WORKS.—The R.D.C. invite tenders for (1) 2,130 yds. of 3-in. solid-drawn Mannesmenn steel tubes, etc.; (2) sluice valves, hydrants, etc.; and (3) for trench work, jointing, etc. Quantities of Mr. Geo. Boyd, Engineer, 33, Queen-street, Whitehaven. Deposit, 10s. for each contract.

JANUARY 8. — **Llantrisant.** — ROADS, ETC.—The Llantrisant and Llantwit Fardre R.D.C. invite tenders for improvements to the road at Redgate, Tonyrefail, in the parish of Llantrisant, erection of firecourt walls, and other apportionment works; also for the laying of about 920 yds. of 12-in. diameter stoneware and c.-i. pipe surface water drains at Gilfach Goch, and about 170 yds. of 9-in. diameter stoneware pipe sewers at Tynynant, in the parish of Llantrisant. Specification, etc, of Mr. Thomas Saunders, Surveyor, School-street, Pontyclun.

JANUARY 9. — **Lexden.** — WATER WORKS.—The Lexden and Winstree R.D.C. invite tenders for supplying, excavating for, laying, and jointing of 800 yds. of 3-in. cast-iron pipes, together with the necessary valves, hydrants, etc., and the erection of brick water tower and provision and fixing of cast-iron tank, and all works in relation thereto. Specification at the office of the engineers, Messrs. Sands & Walker, Milton-chambers, Nottingham. Deposit, £2 2s.

JANUARY 10.—**Durham.**—ROADS, ETC.—The C.C. of Durham invite sole tenders for the following works:—(*a*) For widening Browney Burn Bridge, carrying the Lanchester and Wolsingham main road over Browney Burn within the rural district of Lanchester; (*b*) for widening the Durham and Boroughbridge main road for a length of about 200 yds. at Chilton-buildings; (*c*) for constructing a new road, about 1,800 yds. long, at Ferryhill, and widening the Boroughbridge and Durham main road for a length of about 500 yds. southwards of Ferryhill, including the construction of new steel and concrete bridge over the North-Eastern Railway. Quantities at the County Surveyor's Office, Shire Hall, Durham.

[Those with an asterisk (*) are advertised in this issue.]

ROADS, etc.—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

JANUARY 13. — **Brixham.** — FOOTPATHS, WALL, ETC.—The Brixham U.D.C. invite tenders for relaying the footpaths in Parkham-road and Bolton-street, and building a retaining wall in Berry Head-road. Specification of the Surveyor, Town Hall, Brixham.

JANUARY 14.—**Bootle.**—DRAINAGE WORKS.—The Bootle Corporation invite tenders for the execution of certain drainage works in Derby Park. Plans, etc., at the Borough Engineer's Office, Town Hall, Bootle.

JANUARY 19. — **Baslow.** — BOREHOLES. — The Chesterfield Gas and Water Board invite tenders for sinking trial boreholes near Baslow, Derbyshire. Specifications of Mr. J. Middleton, Clerk, 24, Gluman-gate, Chesterfield.

JANUARY 19.—**Wandsworth.**—STREET WORKS.—The Wandsworth B.C. invite tenders for repairs to Fontaine-road, Hilldown-road, and Strathbrook-road, Streatham. Specifications of Mr. P. Dodd, Borough Engineer, 56, East-hill, Wandsworth. Deposit, £5 5s. in each case.

✱ JANUARY 20. — **Tottenham.** — ROADS AND SEWERS.—The L.C.C. invite tenders for formation, metalling, etc., of about 200 ft. run of 50 ft. road and about 600 ft. run of 40 ft. road, with all the necessary sewers, manholes, gullies, etc.

JANUARY 31.—**Newcastle.**—SEWERAGE WORKS.—The Newcastle (Co. Down) U.D.C. invite tenders for the construction of a complete sewerage scheme for the town of Newcastle, Co. Down. Quantities, etc., of the engineers, Messrs. Swiney & Croasdaile, MM.Inst.C.E., Avenue-chambers, Belfast. Fee, £1 1s.

Auction Sales.

✱ JANUARY 14, 1914.—Messrs. Churchill & Sim will sell by auction, at the Great Hall, Winchester House, Old Broad-street, E.C., an assortment of deals, battens, boards, timbers, etc.

✱ JANUARY 20.—**Gray's Inn-road.** — Messrs. Knight, Frank, & Rutley will sell by auction, at the Mart, freehold property, 254, Gray's Inn-road.

[Those with an asterisk (*) are advertised in this issue.]

OBITUARY.

Mr. Pither.

The death, on December 17, at his residence, No. 91, Tollington-park, N., is announced of Mr. Francis Léon Pither, aged sixty years. Mr. Pither was elected a member of the Architectural Association in 1870; he was the architect of Messrs. G. O. Barrett & Co.'s factories at Wood Green, 1904-6.

TO CORRESPONDENTS.

NOTE.—All communications with respect to literary and artistic matters should be addressed to "THE EDITOR" (and not to any person by name); those relating to advertisements and other exclusively business matters should be addressed to THE BUILDER LTD., and *not* to the Editor.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

All drawings sent to or left at this office for consideration should bear the owner's name and address on either the face or back of the drawing. Delay and inconvenience may result from inattention to this.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

N.B.—Illustrations of the First Premiated Design in any important architectural competition will always be accepted for publication by the Editor, whether they have been formally asked for or not.

PRICES CURRENT OF MATERIALS.

. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.
Per 1000 Alongside, in River.	
Best Stocks	1 16 6
Picked Stocks for Facings	2 10 0

Per 1000, Delivered at Railway Depôt.

	£ s. d.		£ s. d.
Fletton	1 14 0	Best Blue Pressed Staffordshire	3 15 0
Best Fareham Red	3 12 0	Do. Bulinose	4 0 0
Best Red Pressed Ruabon Facing	5 0 0	Best Stourbridge Fire Bricks	4 0 0
GLAZED BRICKS—			
Best White, Ivory, and Salt Glzd Str'tch'rs	12 7 6	Double Headers	1a 17 6
Headers	11 17 6	One Side and two Ends	18 17 6
Quoins, Bulinose and 4½ in. Flats	15 17 6	Two Sides and one End	19 17 6
D'ble Str'tch'rs	17 17 6	Splays and Squints	17 7 6

Second Quality £1 10s. per 1000 less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 9	" "
Best Portland Cement	37 0	per ton, "
Best Ground Blue Lias Lime	20 0	" "

NOTE—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 14s. 0d. per yard delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

[STONE.]

Per Ft. Cube.

	s. d.
BATH STONE — Delivered on road waggons, Paddington Depôt	1 7½
Do. do. Delivered on road waggons, Nine Elms Depôt	1 9½
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, Delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 4½
White Basebed, Delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 6½

STONE (*Continued*).

Per Ft. Cube, delivered at Railway Depôt.

	s. d.		s. d.
Ancaster in blocks	1 10	Closeburn Red Freestone	2 0
Beer in blocks	1 6	Red Mansfield Freestone	2 4
Greenshill in blocks	1 10	Talacre & Gwespyr Stone	2 4
Darley Dale in blocks	2 4		
Red Corsehill in blocks	2 3		

YORK STONE—*Robin Hood Quality.*

	s. d.
Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	2 10
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8
6 in. rubbed two sides ditto, ditto	2 6
3 in. sawn two sides slabs (random sizes)	0 11½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7
1½ in. to 2 in. ditto, ditto	0 6
HARD YORK—	
Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	3 0
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landing to sizes (under 40 ft. super.)	2 8
6 in. rubbed two sides ditto	3 0
3 in. sawn two sides slabs (random sizes)	1 2
2 in. self-faced random flags	0 5

SLATES.

[Per 1000 of 1200 at Railway Depôt.

In. In.	£ s. d.	In. In.	£ s. d.
20 × 10 best blue Bangor	13 2 6	20 × 10 best Eureka unfading green	15 17 6
20 × 12 ditto	13 17 6	20 × 12 ditto	18 7 6
20 × 10 1st q'lity ditto	13 0 0	18 × 10 ditto	13 5 0
20 × 12 ditto	13 15 0	16 × 8 ditto	10 5 0
16 × 8 ditto	7 5 0	20 × 10 permanent green	11 12 6
22 × 10 best blue Portmadoc	12 12 6	18 × 10 ditto	9 12 6
16 × 8 ditto	6 12 6	16 × 8 ditto	6 12 6

TILES.

At Railway Depôt.

	s. d.		s. d.
Best plain red roofing (per 1000)	42 0	Best "Hartshill" brand, plain sand-faced (per 1000)	45 0
Hip and Valley (per doz.)	3 7	Do. pressed (per 1000)	42 6
Best Broseley (per 1000)	50 0	Do. Ornamental (per 1000)	47 6
Do. Ornamental (per 1000)	52 6	Hip (per doz.)	4 0
Hip and Valley (per doz.)	4 0	Valley (per doz.)	3 6
Best Ruabon red, brown, or brindle (Edw'ds) (pr1000)	57 6	Staffords. (Hanley) Reds or Brindled (per 1000)	42 6
Do. Ornamental (per 1000)	60 0	Hand-made sand-faced (per 1000)	45 0
Hip (per doz.)	4 0	Hip (per doz.)	4 0
Valley (per doz.)	3 0	Valley (per doz)	3 6

WOOD.

BUILDING WOOD.	At per standard. £ s. d.		£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 0 0	..	16 10 0
Deals: best 3 in. by 9 in.	15 0 0	..	16 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	12 10 0	..	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0		less than 7 in. and 8 in.
Deals: seconds	1 0 0		less than best
Battens: seconds	0 10 0		" "
2 in. by 4 in. and 2 in. by 6 in.	11 10 0	..	12 10 0
2 in. by 4½ in. and 2 in. by 5 in.	10 10 0	..	11 10 0
Foreign Sawn Boards—			
1 in. and 1½ in. by 7 in.	0 10 0		more than battens.
¾ in.	1 0 0		"
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 5 0 0	..	6 5 0
Seconds	4 10 0	..	5 0 0
Small timber (8 in. to 10 in.)	3 17 6	..	4 0 0
Small timber (6 in. to 8 in.)	3 5 0	..	3 10 0
Swedish balks	2 12 6	..	3 0 0
Pitch-pine timber (30 ft. average)	6 0 0	..	7 0 0
JOINERS' WOOD.	At per standard.		
White Sea: first yellow deals, 3 in. by 11 in.	26 0 0	..	27 0 0
3 in. by 9 in.	24 0 0	..	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	18 10 0	..	19 10 0
Second yellow deals, 3 in. by 11 in.	21 10 0	..	22 10 0
" " 3 in. by 9 in.	20 0 0	..	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	15 0 0	..	16 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 0 0	..	17 0 0
Battens, 2½ in. and 3 in. by 7 in.	14 0 0	..	15 0 0

WOOD (*Continued*).

JOINERS' WOOD (*Continued*)—	At per standard. £ s. d.		£ s. d.
Petersburg: first yellow deals, 3 in. by 11 in.	23 0 0	..	24 0 0
Do. 3 in. by 9 in.	20 0 0	..	21 0 0
Battens	15 0 0	..	16 0 0
Second yellow deals, 3 in. by 11 in.	17 10 0	..	18 10 0
Do. 3 in. by 9 in.	16 0 0	..	17 0 0
Battens	12 10 0	..	13 10 0
Third yellow deals, 3 in. by 11 in.	14 0 0	..	15 0 0
Do. 3 in. by 9 in.	13 10 0	..	14 10 0
Battens	11 10 0	..	12 10 0
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	16 10 0	..	17 10 0
First white deals, 3 in. by 9 in.	14 10 0	..	15 10 0
Battens	13 0 0	..	13 10 0
Second white deals, 3 in. by 11 in.	14 10 0	..	15 10 0
Second white deals, 3 in. by 9 in.	13 0 0	..	14 0 0
Battens	12 0 0	..	12 10 0
Pitch-pine: deals	25 0 0	..	26 10 0
Under 2 in. thick extra	0 10 0	..	1 0 0
Columbian or Oregon Pine, best quality	23 10 0	..	26 0 0
Yellow Pine—First, regular sizes	50 0 0		upwards.
Oddments	35 0 0		"
Seconds, regular sizes	36 0 0		"
Oddments	31 0 0		"
Kauri Pine—Planks per ft. cube	0 5 6	..	0 6 6
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	..	0 3 9
Small " "	0 2 6	..	0 3 0
Wainscot Oak Logs, per ft. cub	0 7 6	..	0 9 0
Dry Wainscot Oak, per ft. super. as inch	0 0 10	..	0 1 2
¾ in. do. do.	0 0 9	..	0 1 0
Dry Mahogany — Honduras, Tabasco, per ft. super. as inch	0 0 10	..	0 1 3
Selected, Figury, per ft. super. as inch	0 1 6	..	0 2 6
Cuba Mahogany	0 1 4	..	0 2 6
			upwards.
Dry Walnut, American, per ft. super. as inch	0 0 10	..	0 1 2
French, "Italian," Walnut	0 0 10	..	0 1 4
Teak, per load (Rangoon or Moulmein)	20 10 0	..	26 0 0
Do., do. (Java)	19 0 0	..	22 10 0
American Whitewood planks, per ft. cube	0 5 6	..	0 6 6
Prepared Flooring, etc.—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 14 6	..	0 18 0
1 in. by 7 in. yellow, planed and matched	0 14 9	..	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 17 6	..	1 3 0
1 in. by 7 in. white, planed and shot	0 14 0	..	0 16 0
1 in. by 7 in. white, planed and matched	0 14 3	..	0 16 6
1¼ in. by 7 in. white, planed and matched	0 16 6	..	0 8 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed boards	0 12 6	..	0 15 0
1 in. by 7 in. " "	0 15 0	..	0 18 6
¾ in. by 7 in. white " "	0 12 0	..	0 14 0
1 in. by 7 in. " "	0 14 6	..	0 16 6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	9 0 0	..	10 0 0
Compound Girders, ordinary sections	11 0 0	..	12 0 0
Steel Compound Stanchions	12 0 0	..	13 0 0
Angles, Tees, and Channels, ordinary sections	11 0 0	..	12 0 0
Flitch Plates	11 0 0	..	12 0 0
Cast Iron Columns & Stanchions, including ordinary patterns	8 10 0	..	9 0 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	9 0 0	..	9 10 0
Staffordshire Crown Bars, good merchant quality	9 5 0	..	9 15 0
Staffordshire "Marked Bars"	11 0 0	..	—
Mild Steel Bars	9 5 0	..	9 15 0
Hoop Iron, basis price	10 0 0	..	—
" " Galvanised	17 10 0	..	—

(* And upwards, according to size and gauge.)

METALS (*Continued*).

IRON (*Continued*)—	Per ton, in London. £	s.	d.		£	s.	d.
Sheet Iron Black—							
Ordinary sizes to 20 g.	10	5	0	..		—	
„ „ 24 g.	11	5	0	..		—	
„ „ 26 g.	12	15	0	..		—	
Sheet Iron, Galvanised, flat, ordinary quality—							
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15	10	0	..		—	
Ordinary sizes to 22 g. and 24 g.	16	0	0	..		—	
Ordinary sizes to 26 g.	17	0	0	..		—	
Sheet Iron, Galvanised, flat, best quality—							
Ordinary sizes to 20 g.	18	10	0	..		—	
„ „ 22 g. and 24 g.	19	0	0	..		—	
Ordinary sizes to 26 g.	20	10	0	..		—	
Galvanised Corrugated Sheets—							
Ordinary sizes, 6 ft. to 8 ft. 20 g.	15	0	0	..		—	
Ordinary sizes, 22 g. and 24 g.	15	5	0	..		—	
Ordinary sizes, 26 g.	16	15	0	..		—	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	12	10	0	..		—	
Best Soft Steel Sheets, 22 g. & 24 g.	13	10	0	..		—	
Best Soft Steel Sheets, 26 g...	15	10	0	..		—	
Cut Nails, 3 in. to 6 in.....	11	0	0	..	11	10	0
(Under 3 in., usual trade extras.)							

LEAD, &c.

	Delivered in London. £	s.	d.		£	s.	d.
LEAD—Sheet, English, 4 lb. and up	21	0	0	..		—	
Pipe in coils.....	21	10	0	..		—	
Soil pipe	21	10	0	..		—	
Compo pipe	21	10	0	..		—	
ZINC—Sheet—	In casks of 10 cwt.						
Vielle Montagne	28	5	0	..		—	
Silesian	28	10	0	..		—	
Zinc, in bundles, 1s. per cwt. extra.							
COPPER—							
Strong Sheet ..... per lb.	0	1	1	..		—	
Thin „ ..... „	0	1	2	..		—	
Copper nails..... „	0	1	0	..		—	
Copper wire..... „	0	1	0	..		—	
BRASS—							
Strong Sheet ..... „	0	1	0	..		—	
Thin ..... „	0	1	1	..		—	
TIN—English Ingots .. „	0	1	11	..		—	
SOLDER—Plumbers' .. „	0	0	10	..		—	
Tinmen's ..... „	0	1	1	..		—	
Blowpipe ..... „	0	1	3	..		—	

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.*

Per Ft. Delivered.

15 oz. thirds	2½d.	26 oz. fourths	3½d.
„ fourths	2d.	32 oz. thirds	5½d.
21 oz. thirds	3½d.	„ fourths	4½d.
„ fourths	3d.	Fluted Sheet, 15 oz.	3d.
26 oz. thirds	4½d.	„ 21 oz.	4d.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.*

Per Ft. Delivered.

⅛ Rolled plate	2½d.	Figured Rolled, Oxford Rolled, Oceanic, Arctic, Muffled, and Rolled Cathedral, white..	3½d.
1/16 Rough rolled and rough cast plate	2¾d.		
¼ Rough rolled and rough cast plate..	3d.	Ditto, tinted	5d.

* Not less than two crates.

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	2	3
„ „ „ in barrels	„	0	2	4
„ „ „ in drums	„	0	2	6
Boiled „ „ in barrels	„	0	2	6
„ „ „ in drums	„	0	2	9
Turpentine in barrels	„	0	2	9
„ in drums	„	0	2	11
Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.)		29	15	0
Red Lead, Dry	per ton	27	10	0
Best Linseed Oil Putty	per cwt.	0	9	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish.....	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak.....	0	12	6
Fine Extra Hard Church Oak	0	10	0

VARNISHES, &c. (*Continued*).

	Per gallon. £	s.	d.
Superfine Hard-drying Oak, for seats of Churches	0	14	6
Fine Elastic Carriage	0	12	9
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	10	0
Finest Pale Durable Copal	0	18	6
Extra Pale French Oil.....	1	1	0
Eggshell Flating Varnish.....	0	18	0
White Pale Enamel	1	4	0
Extra Pale Paper.....	0	12	0
Best Japan Gold Size	0	10	0
Best Black Japan.....	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	0
Berlin Black	0	16	0
Knotting	0	10	6
French and Brush Polish.....	0	10	0

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Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 6 p.m. on Wednesday.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.* unless in some exceptional cases and for special reasons.]

Denotes *accepted.* †Denotes *provisionally accepted.

EAST STOW.—For erection of cottage for the East Stow Rural District Council:—

Combs, ten cottages, £2,614, Murray & Robinson, Stowmarket*; Old Newton, eight cottages, £1,790 16s., E. C. Melton, Great Shelford, Cambridge*; Wetherden, four cottages, £936, E. Death, Stowmarket.*

GILLINGHAM.—For the erection of two villas at Trinity-road, Gillingham. Mr. E. J. Hammond, architect:—

West Bros.	£949	A. G. Webb.....	£777
Gates & Sons	905	H. E. Phillips	750
J. W. Ellingham	845	J. Wilford	710

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West Bros.	£1,595	H. E. Phillips.....	£1,497
J. W. Ellingham ...	1,590	A. G. Webb, Rochester*	1,460
A. Masters	1,530		

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G. Baker & Son.....	£530	West Bros.*	£458
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M. Holmes & Co.	3,833 12 0	H. C. Pullar ...	3,549 0 0
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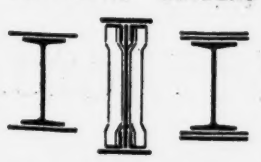

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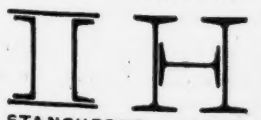

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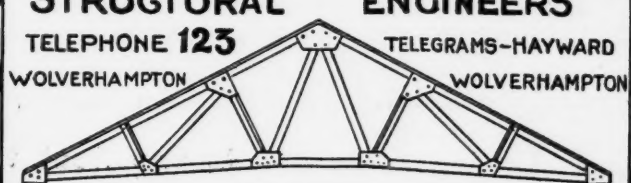

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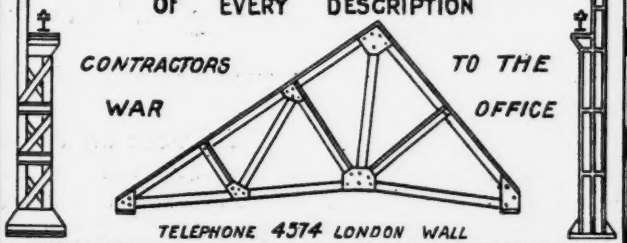

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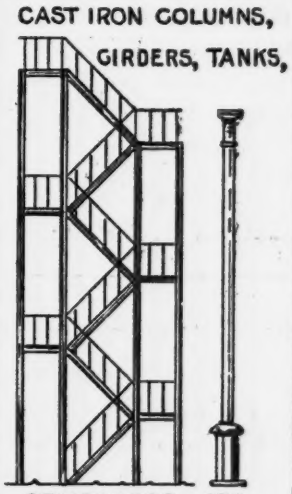

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Refer also to "TOO LATE" column, page xvii.

CONTRACTS.

TO BUILDERS.

The Commissioners of H.M. Works and Public Buildings are prepared to receive TENDERS for the DEMOLITION of certain HOUSES and ALTERATIONS to others in Abingdon-street, S.W.

Drawings, specification, and a copy of the conditions and form of Contract may be seen, and bills of quantities and forms of Tender may be obtained, at H.M. OFFICE of WORKS, Storey's-gate, London, S.W., on payment of one guinea. The sums so paid will be returned to those persons who send in Tenders in conformity with the conditions specified below.

The Commissioners do not bind themselves to accept the lowest or any Tender.

Tenders must be delivered before ELEVEN o'clock a.m. on MONDAY, 5th JANUARY, 1914, addressed to the SECRETARY, H.M. Office of Works, etc., Storey's-gate, London, S.W., and endorsed "Tender for Abingdon-street Houses—Demolition, etc."

H.M. Office of Works, etc.
15th December, 1913.

TO BUILDERS.

The Commissioners of H.M. Works and Public Buildings are prepared to receive TENDERS for ALTERATIONS to the STORE YARD, Hyde Park.

Drawings, specification, and a copy of the conditions and form of Contract may be seen, and bills of quantities and forms of Tender may be obtained, at H.M. OFFICE of WORKS, Storey's-gate, London, S.W., on payment of one guinea.

The sums so paid will be returned to those persons who send in Tenders in conformity with the conditions specified below.

The Commissioners do not bind themselves to accept the lowest or any Tender.

Tenders must be delivered before ELEVEN o'clock a.m. on MONDAY, 11th JANUARY, 1914, addressed to the SECRETARY, H.M. Office of Works, etc., Storey's-gate, London, S.W., and endorsed "Tender for Hyde Park Store Yard Alterations."

H.M. Office of Works, etc.
22nd December, 1913.

[*See also page vi.*

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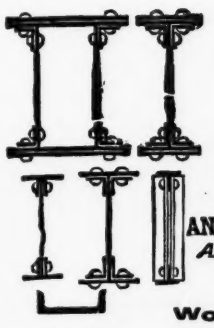

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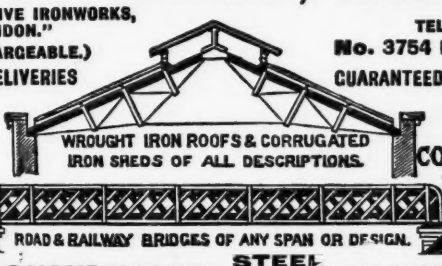

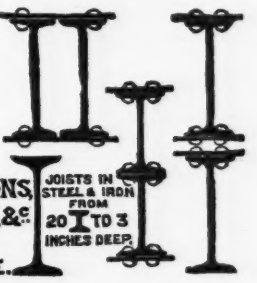

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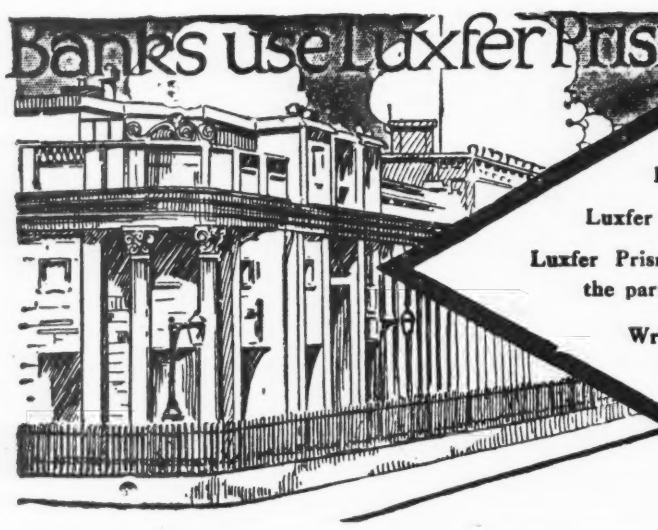

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CONTRACTS (*continued from page* iv.).

TO BUILDERS.

The Commissioners of H.M. Works, etc., are prepared to receive TENDERS for the EXECUTION of ORDINARY WORKS and REPAIRS to the BUILDINGS in their charge in the London {1. North District / 2. South District} for a period of THREE YEARS from the 1st APRIL, 1914.

A map showing the districts comprised in the Contracts may be seen, and copies of the schedules, statements of quantities, conditions of Contract, forms of Tender, and all particulars may be obtained at the undermentioned address, on payment of one guinea in respect of each district.

The sums so paid will be returned to those persons who send in Tenders in conformity with the conditions specified below.

Tenders may be submitted for one or both of the above mentioned districts.

The Commissioners do not bind themselves to accept the lowest or any Tender.

Tenders must be delivered before ELEVEN a.m. on WEDNESDAY, 4th FEBRUARY, 1914, addressed to the SECRETARY, H.M. Office of Works, etc., Storey's-gate, London, S.W., and endorsed "Tender for London Ordinary Works North District" or "South District," as the case may be.

H.M. Office of Works, etc.
22nd December, 1913.

COUNTY of LONDON.

TO ROAD AND SEWER CONTRACTORS.

The London County Council invites TENDERS for the FORMATION, METALLING, etc., of about 200 ft. run of 55-ft. ROAD and about 600 ft. run of 40-ft. ROAD, with all necessary SEWERS, MANHOLES, GULLIES, etc., on the Council's White Hart-lane Estate, Tottenham, N.

Persons desiring to submit Tenders can obtain the specifications, bills of quantities, form of Tender, etc., on application at the ARCHITECT'S DEPARTMENT (Housing Section), 19, Charing Cross-road, W.C., on and after MONDAY, 5th JANUARY, 1914, upon payment to the CASHIER of the COUNCIL of the sum of 1l. 1s.

This amount will be returnable only if the Tenderer shall have sent in a bona-fide Tender, and shall not have withdrawn the same.

Full particulars of the work may be obtained on personal application, and the drawings, specification, and other Contract documents may be inspected at 19, CHARING CROSS-ROAD, before the payment of the fee.

The Contractor will be bound to pay to all workmen employed by him in and about the execution of the Contract or any part thereof wages at rates not less and to observe hours of labour not greater than the rates and hours set out in the Council's list, and such rates of wages and hours of labour will be inserted in and form part of the Contract by way of schedule.

Full particulars of the Council's Standing Orders on these matters are given in the "London County Council Gazette."

Tenders must be upon the official forms, and the instructions therein must be strictly complied with. No Tender received after ELEVEN a.m. on TUESDAY, 20th JANUARY, 1914, will be considered.

The Council does not bind itself to accept the lowest or any Tender, and it will not accept the Tender of any person or firm who has withdrawn a Tender after the same had been opened, unless the reasons for withdrawal were satisfactory to the Council.

LAURENCE GOMME,
Clerk of the London County Council.

County Hall,
Spring-gardens, S.W.
23rd December, 1913.

[*See also page* viii.

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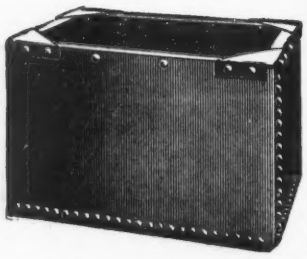

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CONTRACTS *(continued from page vi.)*

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Plans and specification may be inspected, and quantities obtained, at the office of the Architects, Messrs. JOHN H. DAVIES & SONS, 14, Newgate-street, Chester, on and after the 29th inst., on payment of a deposit of three guineas, which will be returned on receipt of a bona-fide Tender.

Tenders to be endorsed "Sealand Range" and forwarded to the undersigned not later than TEN o'clock, JANUARY 9th, 914.

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(By Order)
T. M. KEENE,
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Tenders are to be delivered, sealed, at the CLERK'S Office, Clifden-house aforesaid, on or before TUESDAY, the 6th prox., not later than TWELVE o'clock NOON, marked "Tender for Granite."

The Council do not bind themselves to accept the lowest or any Tender.

(By Order)
STEP. WOODBRIDGE,
Clerk.

Brentford.
19th December, 1913.

[*See also page x.*

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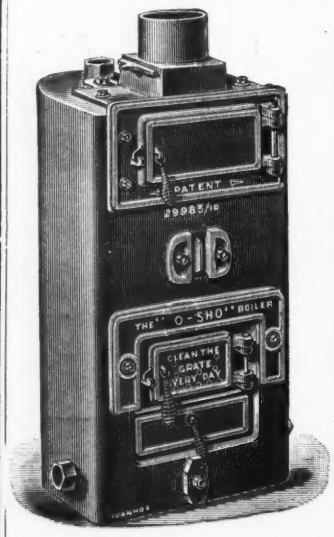

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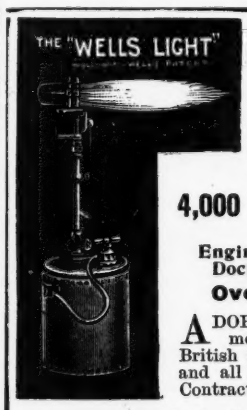

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CONTRACTS (*continued from page* viii.).

COUNTY of KENT.
PROPOSED ADDITIONS TO THE KENT COUNTY LUNATIC ASYLUM AT CHARTHAM DOWNS, NEAR CANTERBURY.
CONTRACT No. 1.

Builders desirous of TENDERING for the ERECTION of TWO BLOCKS of BUILDINGS and other WORKS in connexion therewith at the above Asylum, for the Kent County Asylums Committee, may see the drawings and specifications at the Office of Mr. W. J. JENNINGS, Architect, 4, St. Margaret's street, Canterbury, where they may also obtain copies of the bills of quantities on depositing with him the sum of 10*l*., which will be returned on receipt of a bona fide Tender.

The Quantity Surveyor's charges will be paid by the Committee.

Tenders, on the form provided, are to be delivered to the undersigned not later than TEN o'clock on the MORNING of the 15th day of JANUARY, 1914.

The Committee do not bind themselves to accept the lowest or any other Tender.

FRANCIS R. HOWLETT,
Clerk to the Kent County Asylums Committee.

9A, King-street,
Maidstone.
22nd December, 1913.

BOROUGH of RICHMOND (SURREY).
TO BUILDERS.

The Richmond (Surrey) Town Council, acting as the Local Education Committee, are prepared to receive TENDERS for the ERECTION of a COOKERY CENTRE in Paradise-road, Richmond.

Plans and specification, together with the conditions of Contract, may be seen, and a copy of the bill of quantities and the form of tender may be obtained, on application to Mr. J. H. BRIERLEY, Borough Surveyor, Town Hall, Richmond, Surrey, on depositing the sum of one guinea, which will be returned on receipt of a bona fide Tender.

The Committee do not bind themselves to accept the lowest or any Tender.

Sealed Tenders, on the forms provided, properly endorsed, must be delivered to the undersigned not later than NOON on WEDNESDAY, the 14th JANUARY, 1914, or they will not be entertained.

HENRY SAGAR,
Town Clerk.

Town Hall,
Richmond, Surrey.
December 22nd, 1913.

Refer also to "Too Late" column, page xvii.

WANTED, 200 SLEEPERS, Second-hand, in good condition.—NAPIER MOTOR WORKS, Acton.

NEW MONARCH STONE and BRICK BREAKERS fitted with all our latest and best improvements. 10-in. by 7-in. stonebreaker, 24*l*.; 10-in. by 7-in. brick and light stone breaker, 19*l*.; 10-in. by 6-in. brick breaker, 16*l*. Machines can also be had on road wheels, also with screen if desired at extra cost. Send for lists.—F. PARKER, Dun's-lane, Leicester.

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BRICKS, LIMES, CEMENTS.
PLASTERS OF EVERY DESCRIPTION.
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a large quantity of growing TIMBER, consisting of
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Agent of the Estate,
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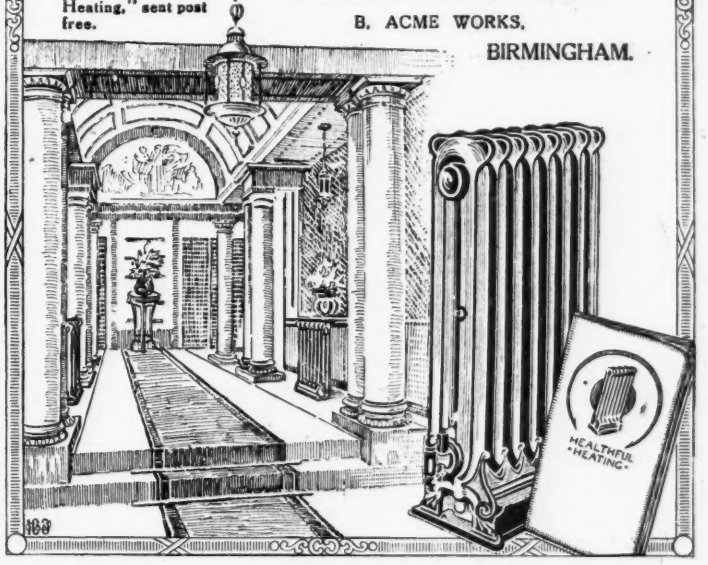

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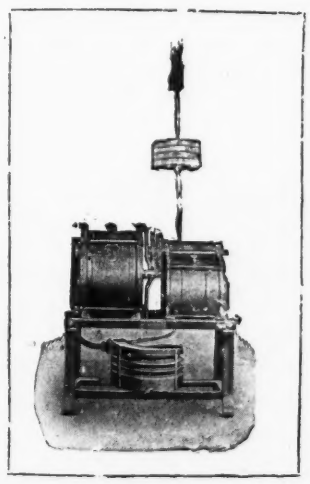

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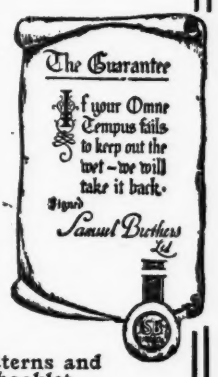

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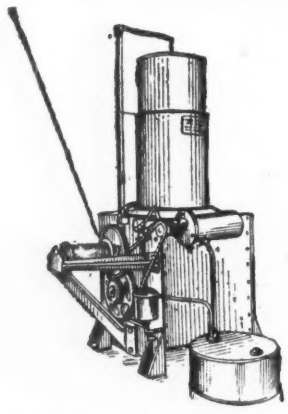

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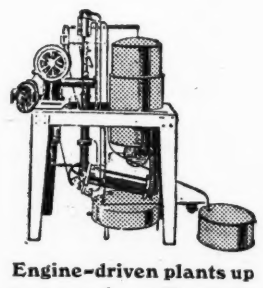

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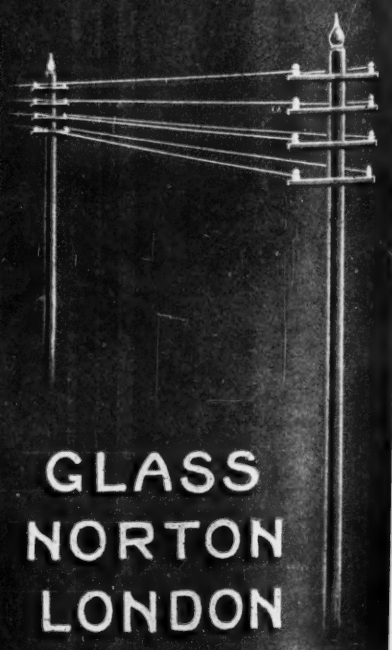

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ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

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N.B.—The Reply Boxes are not intended for trade lists, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

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Particulars of the proposed amendment were set forth in the Illustrated Official Journal (Patents), issued on the 17th DECEMBER, 1913.

Any person, or persons, may give notice of Opposition to the Amendment by leaving Patents Form No. 18 at the Patent Office, 25, Southampton-buildings, London, W.C., within one calendar month from the date of the said Journal.

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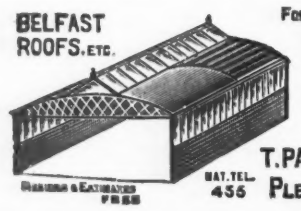

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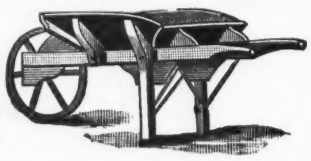
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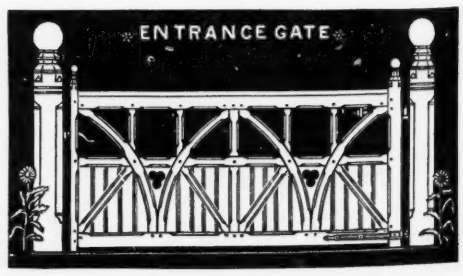

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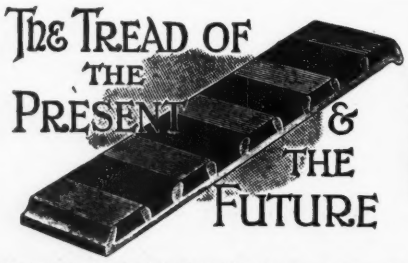

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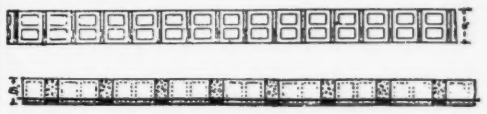

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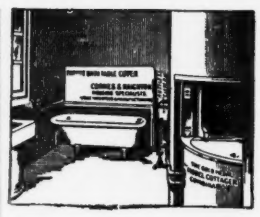

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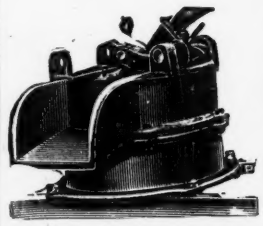

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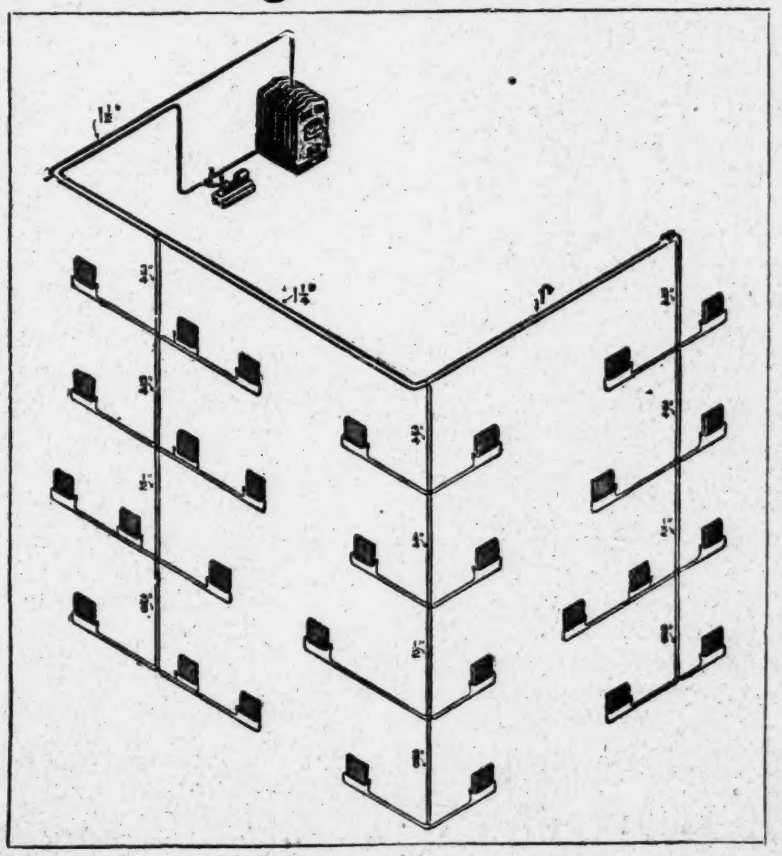

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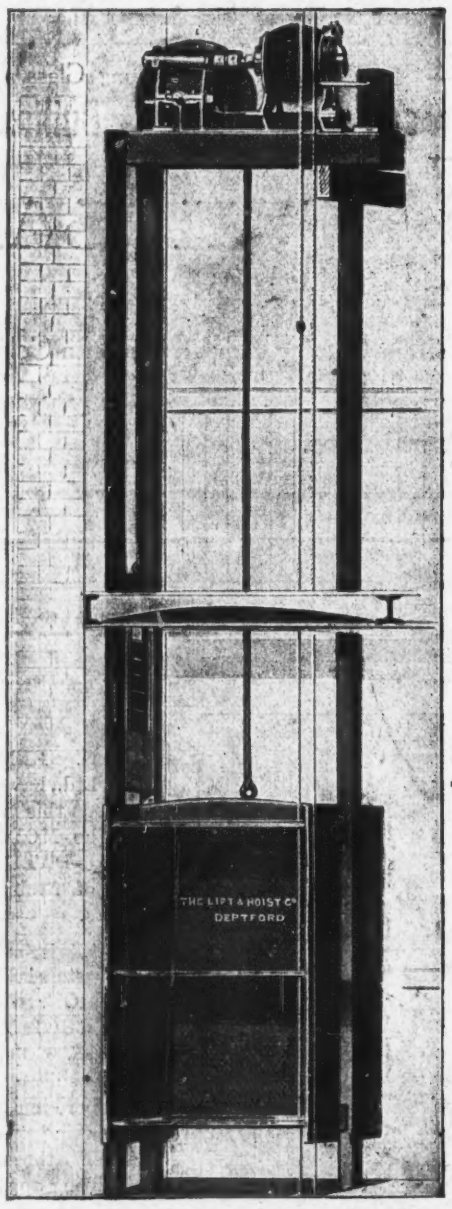

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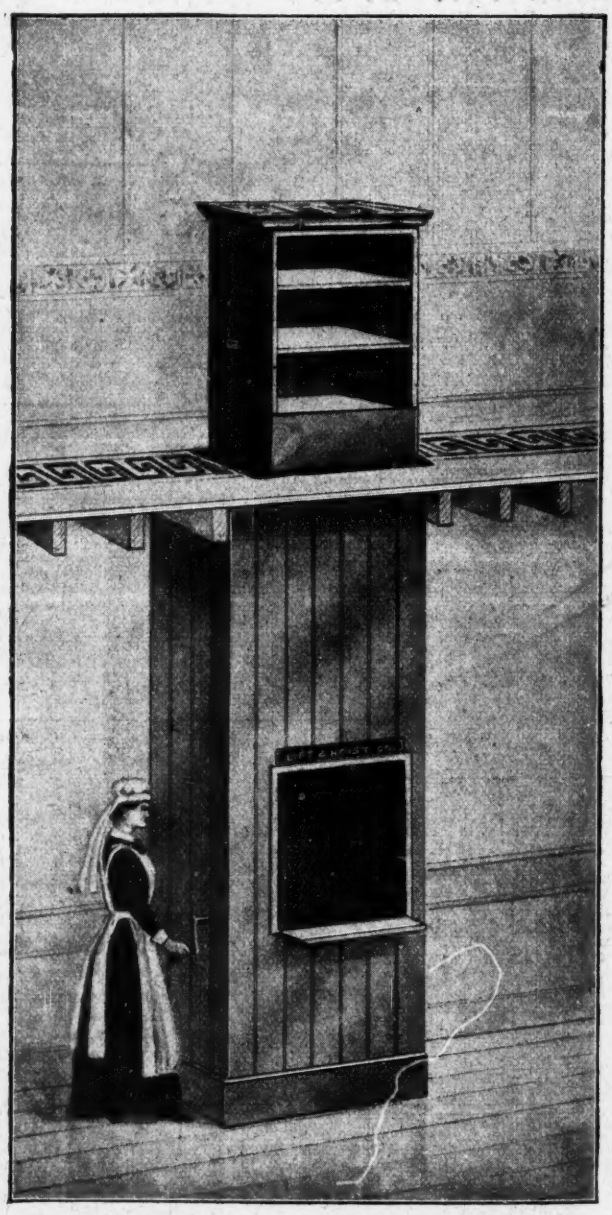

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